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Who wrote "The Groatsworth of Wit?" Was it Greene, as hitherto believed, or Chettle? To distinguish between the two writers' styles, and thereby determine the authorship of a 16th Century literary work of particular interest to Shakespearean scholars, computer-aided techniques were employed. The two authors' differing practices in word choice and other linguistic variables were collected, computated, and analyzed. The vocabularies in their other writings were organized by electronic data processing in the form of verbal indices, concordances, and order-of-frequency lists, and were then compared to a similar analysis of the language in "The Groatsworth of Wit." A great deal of objective evidence in precisely quantified form emerged to testify to Chettle's authorship and forgery of the "Groatsworth." The procedure used has important implications for studies in style and may be applied to advantage in undergraduate and graduate studies, providing, as it does, a way of identifying, surely and verifiably, distinctive stylistic traits of a noted author, and producing ample evidence for their observation and study. Appendices provide documentation. (GO)

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FINAL REPORT

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## THE AUTHORSHIP OF GREENE'S GROATSWORTH OF WIT

Warren B. Austin

Stephen F. Austin State College

Nacogdoches, Texas 75961

April 1969

U. S. DEPARTMENT OF

HEALTH, EDUCATION, AND WELFARE

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# SUMMARY

The broad objective of this project was to develop a computer-aided technique for distinguishing one writer's style from another's; and the method employed was the comprehensive collection, analysis, and measurement of two authors' differing practices in word-choice and other linguistic variables. More specifically, the purpose was to apply these criteria of authorship, once ascertained, to the problem of the authenticity of a work of some importance in Shakespearean studies, namely, *Greene's Groatsworth of Wit* (1592). Purportedly written during his last days by the Elizabethan playwright and pamphleteer Robert Greene, this book contains, in an open letter addressed to Greene's scholar-playwright friends, the well-known attack on Shakespeare as "an upstart Crow beautified with our feathers".

The 11,000-word *Groatsworth of Wit* was licensed for publication seventeen days after Greene's death. Although its genuineness has been questioned from time to time, the view accepted by Shakespearean scholars is that it was indeed written by Greene as a fictionalized account of his life, and that, as the title-page asserts, it was "published at his dyeing request." In earlier research on the problem, however, the present investigator had uncovered substantial evidence, both in the circumstances of its publication, and in its content and general style, that the *Groatsworth of Wit* was spurious; and he had found no evidence that was unequivocally inconsistent with the supposition that the book had been fabricated after Greene's death. Consequently, the hypothesis tested in this study, by the technique of computational stylistics, was that *Greene's Groatsworth of Wit* was in fact a literary forgery, produced to capitalize on the public's avid interest in the manner of life and death of this notorious figure in the world of popular entertainment (much is known of the posthumous exploitation of Greene by sensation-mongering writers and publishers); and that the true author of the book, including the letter to the playwrights and the attack on Shakespeare, was the self-described editor of the manuscript, the printer and free-lance writer Henry Chettle. In the preface to a book published three months later, Chettle denied contemporary charges that he had forged the *Groatsworth of Wit*, insisted that it was "all *Greenes*", and apologized to Shakespeare for not having expunged "Greene's" invective against him.

The importance of establishing the authorship of the *Groatsworth of Wit* lies, of course, in the fact that everything now believed about this first known episode in Shakespeare's career depends on the authenticity of this book. The question of authorship is important also because of the two-hundred-year-old controversy over the meaning of the attack on the "upstart Crow". Some scholars (notably, Edmund Malone and J. Dover Wilson) have interpreted the passage as a charge of plagiarism against Shakespeare; and they have cited it to support their theory that the early history plays were merely Shakespeare's revisions of works by Greene and the other playwrights addressed in the

letter. Others, however, have seen in the invective only a charge of presumption against the actor-playwright for competing against university-educated dramatists. If Chettle's authorship were established, and if it proved possible to reconstruct his method of fabrication, such a reconstruction might well reveal his intention and so lead to a final resolution of this long-debated question.

The assumptions of this study were that a writer employs the variables of expression with characteristic patterns of frequency; and that, if we could detect the patterns in which Greene and Chettle consistently differed, these discriminators would provide the means to determine which of the two was the author of the questioned work.

The primary procedure comprised three phases. First, electronic data processing was used to organize bodies of Greene's and Chettle's prose in the form of verbal indexes, concordances, and order-of-frequency lists. These computer-produced materials were then analyzed for the detection of significantly different patterns of word-choice in the writers, and subsequently of similarly contrasted preferences in their employment of nine other linguistic variables. The problem was to find within each class of variable the particular usages which the two writers employed with the most distinctively different patterns of frequency. Though singly these discriminating usages (e.g., each Greene-favored word) could not be considered reliable indices of authorship over an 11,000-word sample of a writer's prose, the total frequency rates of the individual discriminators within each variable (e.g., all the Greene-favored words taken together) might reasonably be accepted as valid criteria for determining the author of the Groatsworth of Wit. The final phase consisted, then, of systematically comparing the Greene and Chettle practices, thus differentiated, with the patterns of usage of the same variables in the questioned work.

For the test corpora, five entire prose works of Greene, and Chettle's three known prose works, were "read into" the computer. The Greene works were all written within three years of the Groatsworth of Wit and three of them belong to the same genre of Prodigal Son romance as the Groatsworth. The Chettle works, however, ranged in date from 1592 to 1603 and all differed in genre from the Groatsworth. Any bias in the sampling due to closeness in time of composition or similarity of subject-matter consequently operated against the hypothesis. The computer programs generated the following output for each individual work of Greene and Chettle, for the aggregate Greene and Chettle corpora, and for the Groatsworth of Wit: a word index, giving locations of each word-occurrence in the text; a complete concordance, providing a line of context for each indexed word; and a frequency-sorted list, showing all words in descending order of their frequency in each individual work and in the corpus of each writer.

The investigator and his assistants then took an exhaustive comparative inventory of the Greene and Chettle vocabularies, tabulating the number of occurrences of each word, in each individual work and in the corpus of each author, and expressing the frequency rates as average number of occurrences per thousand words of the author's text.

A Differential Ratio for the word, comparing its frequency rates in the two writers, was calculated. Discriminant or marker words were then determined by the following criteria: a minimum of ten occurrences of the word in either author, a Differential Ratio of at least 1.5, and a ratio of variation in frequency within each writer's corpus, from one text to another, lower than the Differential Ratio between the two writers. Potential marker words meeting these criteria were tested for their validity as style predictors against bodies of Greene and Chettle prose other than those used in the screening. Fifty words emerged from this process -- twenty-nine most markedly favored by Greene as compared with Chettle, and twenty-one most markedly favored by Chettle vis-à-vis Greene.

Similar quantitative analyses showed that Greene and Chettle contrasted sharply in their use of seventeen high-frequency function words, and in their use also of the thirty-three least common words found in the Groatsworth of Wit. Finally, study of their usage of five morphological variables (prefixes, suffixes, reflexive pronouns, gerund plurals, and compound words) and two syntactical features (parentheses and word-order inversion) produced many additional discriminators of the two writers' linguistic habits.

When the contrasting rates of usage of these ten classes of language variables were applied as authorship tests to the Groatsworth of Wit, the frequency patterns found in the questioned work differed in every case from those that had been established as characteristic of Greene; and in every case they matched those established as typical of Chettle. For the words in which their usages contrasted most markedly, the 29 Greene-favored words occur collectively in the Groatsworth of Wit at less than one-fourth their average collective frequency in Greene's prose, whereas the 21 Chettle-favored words occur in the Groatsworth at almost precisely the rate to be expected if the book was another sample of Chettle's prose. Only 38% of the Greene-favored words, as compared with 86% of the Chettle-favored words, turn up in the questioned work. The six words which Chettle uses as a group 37 times as often as Greene (almost two occurrences per one thousand words, as compared with Greene's one occurrence in twenty thousand words) show 22 occurrences in the 11,000-word Groatsworth of Wit. Of the seventeen high-frequency words which qualified as discriminators, fourteen have frequency-distribution patterns in the Groatsworth that are unlike Greene's and similar to Chettle's; all five such words showing the greatest Differential Ratios between the two writers (a, and, as, by, and so) have patterns more like Chettle's than Greene's. Of 33 relatively uncommon words and word-senses sifted out of the Groatsworth by pre-established criteria, none appears in the Greene corpus, whereas five appear in the much smaller Chettle corpus.

For the group of prefix discriminators, the frequency rate of words beginning with these prefixes in the Groatsworth (29.3) differs decidedly from Greene's average rate (18.8) and agrees well with Chettle's

(31.3).* And for the suffix discriminators as a group the Groatsworth rate of 17.1, almost double Greene's typical rate of 9.1, matches the Chettle rate of 17.6. Individually, all the prefixes, and all but one of the suffixes, show rates approximating Chettle's and differing widely from Greene's. The Groatsworth also exhibits Chettle's practice in using reflexive pronouns and plural forms of the gerund at a markedly higher rate than Greene.

For all ten categories of compound words in which the two writers have distinctively different rates of usage (Greene's being in each case lower than Chettle's), the frequencies in the Groatsworth reflect Chettle's practice, not Greene's. Grouping of the four categories in which the Differential Ratios between the authors are greatest yields an average frequency of .39 for Greene, 1.97 for Chettle, and 2.73 for the Groatsworth of Wit. In the use of parentheses (excluding conventional usages), the Groatsworth rate of 4.81 is five and one-half times Greene's average rate of .86 and almost four times the highest rate (1.34) found in the five Greene works concorded, whereas it is consistent with Chettle's average rate of 3.69 and virtually identical with his highest rate (4.69) in a single work.

Study of the word-order positions of prepositional phrases revealed that, in every one of the twelve discriminating categories, the Groatsworth of Wit had rates of inversion from three to twenty-five or more times higher than Greene's and remarkably similar to Chettle's. The total rates for all discriminant categories are 1.34 in Greene, 4.75 in Chettle, and 4.38 in the Groatsworth. For the four types of prepositional phrase inversion by which Chettle's prose style can be most clearly distinguished from Greene's, the Groatsworth frequency is similar to Chettle's and over sixteen times that of Greene.

When the Groatsworth was checked for a number of idiosyncratic usages of the two writers, Chettle's authorship was strikingly confirmed. Greene invariably uses the combinative forms howsoever, whatsoever, whensoever, wheresoever, and whosoever, avoiding the parallel -ever forms (however, whatever, etc.); but the -ever forms predominate in the Groatsworth, as they do also in Chettle. Greene has the colloquial form ye only one-half of one percent of the times he uses the second person pronoun; the rate is 38% in Chettle and 19% in the Groatsworth. Not only Chettle's distinctively higher frequencies for the prefix un- and the suffix -less, but also his unorthodox formations with these negative affixes are reflected in the Groatsworth. Greene has no case of the noun + present participle type of compound, which occurs at a rate of one per 5000 words in Chettle; three cases (home-breeding, sun-darkening and wine-washing) appear in the Groatsworth. Finally, four categories of prepositional phrase inversion that do not occur at all in the Greene corpus occur 36 times in Chettle and five times in the

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*All frequencies are given as average number of occurrences per 1000 words.

Groatsworth of Wit.

When the letter to the playwrights, which contains the passage on Shakespeare, was concorded separately and tested by each of the lexical, morphological, and syntactical criteria that had proved reliable discriminators of the Greene and Chettle styles, the findings were as follows: For eleven of the thirteen stylistic tests applied, the frequency rates appearing in the letter are unmistakably those characteristic of Chettle; and specific usages also reflect Chettle's linguistic habits. The similarity is especially marked in the two syntactical features, parentheses and word-order inversion. Besides the extraordinarily high frequency of parentheses, as in Chettle compared to Greene, six of the ten instances in the letter can be closely paralleled in Chettle, whereas none can be identified as characteristic of Greene; moreover, three parenthetical phrases which appear in Chettle, and never in Greene, turn up also in the letter. Similarly, the types of prepositional phrase inversion that Chettle favored appear in the Groatsworth; most notably, Chettle's inversion of phrase and past participle (as in by him forsaken), which does not occur at all in the Greene corpus, appears in the letter ("Looke but to me, by him perswaded"). Thus the evidence of linguistic preferences provides an independent demonstration of Chettle's authorship of the famous letter to Greene's fellow-playwrights -- and consequently of his authorship of the attack on Shakespeare hitherto believed to have been penned by Robert Greene.

The technique of computational stylistics developed in this project provided the means of effectively distinguishing two prose styles, namely those of Robert Greene and Henry Chettle. A computer-aided comparative analysis of their known writings, focussing on their habits in the use of ten diverse variables of expression, produced a formidable battery of contrasting practices; and the application of these as criteria of their respective styles yielded a large body of objective evidence, in concrete and precisely quantified form, testifying to Chettle's authorship of the book published as Greene's Groatsworth of Wit. This evidence points decisively to Chettle's having forged the Groatsworth of Wit, including the letter to Greene's fellow-playwrights and the attack on Shakespeare, within three weeks after the death of the purported author.

Discovery of the actual authorship of this book writes a new story of the first known episode in Shakespeare's career as an actor and playwright. Instead of envisioning a resentful literary rival attacking Shakespeare from his deathbed, we now see the enterprising free lance, Henry Chettle, perpetrating a publishing hoax to exploit the public interest excited by the sensationalized news of Greene's death. In concocting the purported last letter of Greene to his scholar-playwright friends, Chettle followed the format of popular repentance literature. And in having Greene inveigh against Shakespeare as "an upstart Crow", he added to his fabrication the spice of provocative topical allusion. The implication of the episode is that Shakespeare was already so famous in 1592 for his trilogy of Henry VI plays that satirical comment on him made lively publicity for the book.

In the light of this new perspective on the attack, the investigator hopes his further study of Chettle's method of fabrication will resolve the question of whether the dramatist was being charged with plagiarism or presumption.

The technique of computational stylistics employed in this research is generally applicable to problems of authorship attribution. It also has significant implications for the development of more objective methods in the study and teaching of literary style in college courses, especially on the advanced undergraduate and the graduate levels.

# I

# INTRODUCTION

## The Problem.

The broader objective of this project was to develop, and test the value of, a computer-aided technique in the analysis of literary style. Primarily, the focus was on a writer's pattern of lexical preferences and the possibility of distinguishing one author's style from another's by their different habits of word-choice. As the investigation proceeded, however, the technique of computational stylistics was extended to include also studies of morphological and syntactical variables--notably prefixes and suffixes and word-order inversion--which promised further means of stylistic discrimination.

The more specific and immediate objective was the application of the computer technique to the solution of an authorship problem which is of considerable importance in Shakespearean studies. The project arose in fact out of the need to determine, more conclusively than had proved possible by the investigator's earlier collection and analysis of external and internal evidence, whether Robert Greene, Elizabethan playwright and pamphleteer, actually wrote the pamphlet, Greene's Groatsworth of Wit, with its famous attack on Shakespeare as "an upstart Crow beautified with our feathers". This work, purporting to be Greene's own story of his life in semi-fictional form, was published posthumously under his name in late September of 1592. It was followed within a few weeks by The Repentance of Robert Greene, purporting to be purely autobiographical; and this work, whose authenticity is also in question, is the main source for Greene's life, especially for his supposed continental travels, profligacy, periodical spasms of remorse, and deathbed repentance. Both the Groatsworth of Wit and the Repentance, though often questioned, have up to now been accepted as genuine writings of Robert Greene. The present investigation examines the hypothesis that these books were posthumous forgeries; specifically, that the Groatsworth of Wit was fabricated immediately after Greene's death by the supposed editor, Henry Chettle, and that the Repentance was produced to further exploit the profitable hoax that had been perpetrated on the reading public.

Apart from the far greater importance of this book because of the allusion to Shakespeare, the study concentrates on the problem of the Groatsworth of Wit for the reason that in this case only two writers are in question, the putative author, Greene, and the suspected forger, Chettle; in the case of the Repentance, no external evidence points to a particular suspect and the identity of its author cannot therefore be established by a single comparative stylistic study. The Groatsworth of Wit, moreover, is long enough (11,000 words) to provide adequate text for the projected analyses, whereas the Repentance is not only much shorter, but contains sections which do not purport to have been written by Greene. It should also be said that the Repentance is more patently open to skepticism; its acceptance has usually been predicated on prior acceptance of the Groatsworth, and few would be inclined to maintain its authenticity if the Groatsworth were shown to be spurious.

The aim, then, is to use electronic data processing to facilitate a comprehensive comparison of certain features of the styles of Greene and Chettle, in the hope that such an analysis will produce decisive evidence of the authorship of Greene's Groatsworth of Wit.

## Background of the Study.

Robert Greene, playwright and prolific author of pamphlets and romances, died in London on September 3,1592 after, according to present belief, having launched from his deathbed a bitter attack on the rising Shakespeare. One of the mainstays of the popular press, and long a colorful figure in the life of the town, he was especially notorious for a series of "conycatching" pamphlets advertised as inside revelations of the Elizabethan underworld. The news of his death was something of a sensation; and hackwriters and publishers were demonstrably active in exploiting the public interest it aroused.

The two pamphlets which purported to be Greene's own accounts of a profligate life and remorseful end--Greene's Groatsworth of Wit and The Repentance of Robert Greene--were licensed for publication by entries in the Stationers' Register, to different publishers, on September 20 and October 6,1592, respectively. They are, at least superficially, much like Greene's undoubted writings in content and style. Besides the title-page ascription, the external evidence that has weighed most heavily in the acceptance of them as authentic by all editors of Greene, and by literary historians generally, is the testimony of Henry Chettle. Printer, publishers' agent, free-lance pamphleteer, and later dramatist, Chettle declared in the preface to his Kind-Heart's Dream, three months after Greene's death, that "many papers" by Greene were in booksellers' hands when he died, among them the Groatsworth of Wit; and further that he (Chettle) had copied over the almost illegible manuscript of the Groatsworth for licensing and printing. Replying to contemporary charges that he had forged the Groatsworth of Wit in Greene's name, he affirmed that the work was indeed "all Greenes". At the same time, while declining to apologize to Marlowe for references to him in the book as a Machiavellian and an atheist, he regretted that he had not exercised editorial discretion to expunge the harsh allusion to Shakespeare, whom he had since come to admire greatly. Chettle's much-quoted tribute to Shakespeare in this later book may have predisposed Shakespearean scholars to believe his story of the authorship of the Groatsworth of Wit and to discount the contemporary charge of forgery.

As already noted, however, skepticism about the genuineness of these pamphlets has been expressed from time to time over the past century, chiefly because of the circumstances surrounding their posthumous publication and the difficulty of crediting the confessions they present of Greene's alleged depravity. Such doubts have been ineffectual; and they have in any case usually been limited to suspicion of editorial tampering with actual Greene manuscripts. The latest effort to impugn the authenticity of the Groatsworth and the Repentance, by Chauncey

Sanders a generation ago, was promptly rebutted by Harold Jenkins; and subsequently René Pruvost, after an extensive analytical review of the question, was confident that both works should remain in the Greene canon.[1] Yet the specter of doubt that has haunted these pamphlets has not been exorcised. The question of authorship is still moot; and an effort to resolve it by stylistic analysis is long overdue.

The importance of establishing the authorship of the Groatsworth of Wit is that it concerns the truth of what has up to now been believed about the first known episode in Shakespeare's career. The hostile allusion to him as an actor and playwright in London is contained in an open letter written into the Groatsworth and addressed especially to Greene's fellow-playwrights, Marlowe, Nashe, and Peele. These university-educated writers are warned against the successful "upstart Crow, beautified with our feathers, that with his Tygers hart wrapt in a Players hyde, supposes he is as well able to bombast out a blanke verse as the best of you: and beeing an absolute Iohannes fac totum, is in his owne conceit the only Shake-scene in a countrey." All biographers of Shakespeare, assuming the genuineness of the Groatsworth of Wit, have pictured an envious Greene penning this resentful diatribe. But if the Groatsworth was in fact wholly a posthumous fabrication, the true story of the attack on Shakespeare was very different indeed. On the hypothesis of forgery, the book was a hoax perpetrated by Henry Chettle, in collusion with others in the book trade, to capitalize on the great popular interest excited by the news of Greene's death. If the fabrication was total, then Chettle's literary impersonation of Greene included the composition of the letter to the playwrights; and the motive for the satirical onslaught on Shakespeare (as also for the allusions to Marlowe) was Chettle's journalistic desire to spice the book with topical sensationalism. The newly-famous Shakespeare had high publicity value in the fall of 1592.

More is involved than the incident itself. The question of how we are to interpret "Greene's attack upon Shakespeare" is one of the greatest cruxes in Shakespearean scholarship. Controversy has raged over this passage for two hundred years, from the time of the great eighteenth century scholar Edmund Malone to the present. Many, like Malone and J. Dover Wilson, have read the lines as a contemporary accusation of plagiarism against Shakespeare, which supported their theory that his early history plays were merely revisions of works by Greene and the other playwrights addressed in the letter. Other Shakespearean scholars, on the contrary, have seen in the invective merely a charge of presumption against the less well educated actor-playwright for competing with his betters. If Chettle's authorship of the Groatsworth were established, it might then be possible to reconstruct his method of fabrication; and there is reason to hope that such a reconstruction might lead to a final determination of this long-debated question.

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[1] Chauncey E. Sanders, "Robert Greene and his 'Editors'", Publications of the Modern Language Association (PMLA), XLVIII (1933), 392-417; Harold Jenkins, "On the Authenticity of Greene's Groatsworth of Wit and The Repentance of Robert Greene", The Review of English Studies, XI (1935), 28-41; René Pruvost, Robert Greene et ses Romans (Paris, 1938, pp. 503-545.)

## Earlier Work.

In earlier research on the problem, the present investigator has developed a body of both external and internal evidence which in his view converts the prior probability in favor of authenticity into a fairly strong likelihood that both "last works" of Greene were in fact posthumous forgeries. This evidence (which will be published elsewhere, along with the results of the present study) can be summarized briefly as follows: Substantial reasons exist for questioning the veracity of Chettle's story of editing an actual Greene manuscript. His credibility fails on closer examination; it is to be noted, moreover, that the Groatsworth of Wit was licensed for publication, not on the responsibility of the publisher, but "upon the perill of Henrye Chettle." Chettle is a most likely suspect, with the best opportunity, the most obvious of commercial motives, and superb qualifications as a writer, for such a fabrication. Evidence can be given of his penchant for hoaxing the public and of his ability to produce a good imitation of Greene's work. Publishing conditions at the time were highly conducive to the production of pseudo-Greene writings. Indeed, much is known about the posthumous exploitation of Greene by sensation-mongering publishers; and among these were the men who printed the Groatsworth, namely, John Wolfe and John Danter, both notorious for fraudulent and sensational publications. Contemporary disbelief in Greene's authorship of the posthumous pamphlets can be much more fully documented than has hitherto been thought. Certain broad features of the Groatsworth of Wit--especially its hybrid character and amoral tone--which are not characteristic of Greene's writings, are thoroughly consistent with Chettle's authorship. In details of content, the Groatsworth is marked by a kind of echoing of Greene's works which is different from the self-repetition that Greene was prone to. At the same time, errors in the text are apparent "slips" of the forger. As to The Repentance of Robert Greene, the existence of the same stylistic features in the main text, purportedly by Greene, as in the editor's account of Greene's death and in the publisher's preface, provides the strongest evidence of fabrication. The incredibility of the content, and certain other aspects of the book hitherto ascribed to other causes, can be more satisfactorily explained by the hypothesis of a fabricator working under the necessity of outdoing the lucrative sensationalism of the previously successful Groatsworth.

## Hypotheses.

The hypotheses on which the present investigation is based are consequently the following: (1) that both Greene's Groatsworth of Wit and The Repentance of Robert Greene were products of the posthumous exploitation of popular interest in Greene and the manner of his life and death; (2) that the Groatsworth of Wit was wholly fabricated by Henry Chettle in Greene's name, and that in forging the work Chettle assumed Greene's character and counterfeited his style; (3) that, far from Greene's having written the attack on Shakespeare, Chettle composed the letter to Greene's fellow-playwrights, including the attack, as an integral part of the hoax; and (4) that The Repentance of Robert Greene was also a fabrication, but that it was adapted in part, as Sanders conjectured, from a presumably genuine unfinished manuscript by Greene, "The Repentance of a Conycatcher", which Danter, who printed the Repentance, is known to have possessed.

The hypothesis relevant to the broader objective of this project is that a computer-aided collection and analysis of writers' differing practices in lexical choice, and in other objectively measurable characteristics of style, can produce a body of concrete, precisely quantified data that will satisfactorily distinguish one writer's style from another's and provide probative evidence for the attribution of a disputed work.

## Purpose.

The purpose, therefore, of the present study is to use electronic data processing as an aid in making a comparative analysis of the known writings of Robert Greene and Henry Chettle. If we can discover concrete, quantifiable characteristics that differentiate their styles, we can then match these stylistic discriminators as criteria of authorship against the language practices found in the questioned work. It is hoped to arrive thus at a determination of the relative probabilities of authorship as between the purported author of the Groatsworth of Wit and the suspected forger.

The special challenge in this attempt to establish authorship by stylistic evidence lies in the fact that both Greene and Chettle wrote in a highly conventional, cliché-ridden manner (showing little individuality, for example, in imagery and allusions), and used the common diction of Elizabethan popular prose; and that, on the hypothesis of fabrication, the forger's efforts to produce a counterfeit good enough to ring true for a reading public highly familiar with Greene's writings would tend to obscure the normal differences between their styles and make it all the more difficult to distinguish between them.[1]

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[1] Neither Sanders (pp. 396, 399), nor Pruvost (p. 512) believed it possible to determine the question of authorship by stylistic evidence.

## II

## METHODOLOGY

### Rationale.

The basic assumptions of this study are the following: that a writer exhibits individual patterns of linguistic preference as he employs the many variables of expression; that when the data for his use of any given variable, such as lexical choice, are collected and quantified, the rates of frequency and the idiosyncrasies that emerge may serve to distinguish his style from that of another writer in respect to the variable in question; that such patterns of frequency and usage can indeed be detected and precisely quantified for comparison; that some will be found reliably consistent in a writer's work irrespective of lapse of time or changes of subject-matter; that differences of this sort in linguistic choice are largely unconscious and habitual, and therefore, for the most part, inimitable; and, finally, that cumulative evidence of such distinctive and characteristic patterns of linguistic usage will be probative for authorship attribution.

In brief, these assumptions amount to saying that, if the posthumously-published Groatsworth of Wit was genuinely Greene's, it will exhibit his distinctive preferences in word-choice and other linguistic practices; and that, if on the contrary it was written by Chettle, it will exhibit the quite different patterns of preference characteristic of his style. If Chettle was the author, his hand should be revealed, however much he sought to imitate Greene, by his inability either to reproduce to any great extent Greene's habitual practices, or to slough off for the nonce his own linguistic predilections.

### Technique.

The general technique employed consisted of a procedure for the study of lexical choice, supplemented by a series of procedures for the study of other linguistic preferences. The primary procedure comprised three stages: (1) the use of electronic data processing to organize the vocabularies of Greene's and Chettle's writings in the form of verbal indexes, concordances, and order-of-frequency lists; (2) the analysis of these computer-produced materials for the detection of the significantly different practices of the two writers in choice and usage of words; and (3) the systematic comparison of the Greene and Chettle preferences, thus differentiated, with those found in the Groatsworth of Wit (similarly indexed and concorded by computer) to ascertain whether the disputed work exhibits the patterns of word-usage characteristic of Greene or Chettle. The materials produced for the study of lexical choice were then employed for the collection of quantitative data on a number of other linguistic variables. Where contrasting patterns were found, these provided additional criteria for distinguishing the Greene and Chettle styles and helping determine the authorship of the disputed work.

## Choice of Corpora.

From Greene's voluminous writings, five works published in the last two years of his career (104,596 words in all) were chosen as a representative and adequate sample of his late prose.[1] Three of these--Greene's Mourning Garment, Never Too Late, and Francesco's Fortunes--belong to the same genre of repentance pamphlet, modeled on the parable of the Prodigal Son, as the Groatsworth of Wit; the others--A Notable Discovery of Cosenage, the first of Greene's cony-catching pamphlets, and A Quip for an Upstart Courtier, a social satire--were chosen to reveal variations of usage due to difference of genre. All were written within at most three years of the Groatsworth of Wit. The choice of whole works, it was felt, rather than randomly selected blocks of text, would make immediately apparent which usages varied with genre and subject-matter, and which showed relatively consistent frequencies throughout the author's work. The body of Chettle's writings to be concorded for comparison constituted, except for the epistles to be mentioned below as control material, the entire corpus (totalling 43,190 words) of his known prose.[2] These three works--Kind-Heart's Dream, Piers Plainness' Seven Years Prentiship, and England's Mourning Garment--are heterogeneous in genre and subject-matter, and none belongs to the same genre as the 10,999-word Groatsworth of Wit; they range in date from 1592 to 1603. Whatever bias might exist in the sampling procedure because of similarity of subject-matter or closeness in time of composition, would favor Greene and operate against the hypothesis.

## Pre-editing and Keypunching of Texts.

The Greene and Chettle texts were pre-edited for the computer in order to impose essential uniformity on the diversity of editorial practices found in the printed editions; this was necessary to insure accuracy in the tabulation of frequencies.[3] Modern practice was followed in the use of the letters u, v, i, and j; and the ampersand was spelled out. Compounds occurring as open forms in the original--e.g., mean while, how ever, and life time--were closed or hyphenated.[1] The vexing ambiguity of the alternative spellings of such frequently occurring words as then and than, lest and least, lose and loose, which were spelled interchangeably in Elizabethan usage, was eliminated by the adoption of modern spelling in these cases, again to facilitate accurate tabulation.

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[1] See Appendix A for a complete list of the texts concorded for this study.

[2] The figures given are the computer word-counts. Verse interpolated in Greene's and Chettle's prose works (approximately equal in amount in the two authors) was included in the concorded texts.

[3] The best available modern editions were used, and Xerox copies of the original sixteenth century editions were consulted to correct a very few obvious errors in word forms. The innumerable minor departures from the originals in spelling and punctuation, especially in the Grosart edition of Greene, were not corrected; they could safely be ignored for the purposes of this study.

After pre-editing, the texts were keypunched onto IBM cards, one line per card for easy reference from computer printout to printed texts. Each line of text was followed by an identification consisting of a letter symbol, a three-digit number, and a two-digit number, designating respectively the title of the individual work, the page, and the line on the page (in the volume containing the base-text used).[2] Thus the identification K035 19 locates Line 19 (and each word it contains) on Page 35 of Chettle's Kind-Heart's Dream, in the Bodley Head Quarto edition. No verifier being available, each keypunched text was proofread and corrected from the computer printout. The data were then transferred from cards to magnetic tape and stored in the memory banks of the high-speed IBM 7094 computer for subsequent retrieval by the concordance and other programs.

Computer Programs and Output.

A suite of three computer programs was written to generate the following output for each individual work of Greene and Chettle, for the aggregate Greene and Chettle corpora, and for the Groatsworth of Wit: (1) a WORD INDEX, listing alphabetically all the word-forms in the text, together with the total number of occurrences and the location of each occurrence; (2) a complete CONCORDANCE, providing a line of context for each occurrence of the indexed word-form. (The provision of only one line of context, while keeping the overall bulk of the concordance within easily manageable proportions, unfortunately necessitated frequent recourse to the original texts to ascertain the precise meaning or usage of a word); and (3) a FREQUENCY-SORTED list, showing all word-forms in descending order of their frequency.[3]

Post-editing of the Computer Output.

Most of the problems presented by the Elizabethan texts were dealt with by post-editing the computer output. Upon delivery of the first computer-generated concordances, the chief investigator and a group of assistants (one instructor and several graduate assistants in English) edited the volumes to effect the following: (1) the grouping of spelling variants (e.g., do-doe-doo, beeing-being), (2) the grouping of inflectional forms of the same word (e.g., go-goes-goeth-gone-went), and (3) the separation of homonyms (e.g., the different words designated by the homograph sound); words like feign, "pretend", and fain, "happy, willing" were especially troublesome, since the spellings were interchangeable. Once the required skill in recognizing all forms and senses of a word had been attained, however, it was found possible to achieve the desired results by carefully scrutinizing all possibly relevant context entries as the occurrences of each word were tabulated. Several re-checks insured accuracy; and words which appeared as prospective marker words went through subsequent checks for accurate tabulation of frequencies and then a final check when the tabulations for individual works were read against the aggregate concordances.

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[1] In cases of tmesis (e.g., "how greatly soever she feared"), the forms were re-united at the post-editing stage.

[2] See Appendix B for card format. The longer type-line in Chettle's England's Mourning Garment sometimes required a second card, to which a duplicate number was assigned.

[3] For a complete list of computer-generated volumes, including the output of the subsequent programs noted below, see Appendix C.

## Tabulation and Quantification.

The number of occurrences of each word in each individual work of Greene and Chettle was recorded on a tabulation sheet having appropriately labelled cells. Singular and plural forms of nouns, inflected verb forms, and comparative forms of adjectives were combined under the one base form for each part of speech. Different parts of speech--e.g., like, as verb, noun, and preposition--were separately tabulated. The total of occurrences of a word in each work was then expressed as a rate per thousand words--thus the total of 11 occurrences of the word although in the 20,000-word text of Greene's Quip for an Upstart Courtier was recorded as a frequency rate of .55 per thousand.[1] The total of occurrences of the word in each complete corpus was also recorded, both in absolute figures and as a rate per thousand words of text.

When all occurrences had been recorded in this way, it was possible to note the variations of frequency from one individual work to another within each writer's corpus and to compare both the overall average frequency, and the range of variation, of the word in Greene as compared with Chettle. In the absence of word-frequency tables for general Elizabethan vocabulary usage, a simple two-way comparison was set up, that is, Greene's pattern of usage was compared with Chettle's without regard to the general usage of the time.[1] A Differential Ratio expressing the comparative frequency of use of a word by the two writers was then calculated by dividing the larger overall frequency figure, whether Greene's or Chettle's, by the smaller. Thus Greene's overall use of the word able is at the rate of .27 per thousand words, Chettle's rate is .65 per thousand, and the Differential Ratio for this word favored by Chettle in comparison with Greene is 2.41.

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[1] The texts used in the tabulations were slightly reduced, by omissions at the latter ends, to provide rounded Greene and Chettle corpora of 100,000 and 40,000 words for ease of calculation.

## Detection of "Marker Words".

The search for the marker words--those showing the greatest difference in frequency of use by the two writers--then began, the following arbitrary criteria for potential discriminators having been adopted in advance; (1) the word had to occur at least ten times in either corpus[2] (A word apparently favored by Greene as compared with Chettle, a Greene "plus-word", had to occur at least 10 times in the Greene corpus; a Chettle "plus-word" had to occur 10 times or more in the Chettle corpus); (2) it had to be favored by one writer over the other by a Differential Ratio of at least 1.5; (3) its ratio of variation within the writer's corpus, from one text to another, had to be lower than the Differential Ratio; and (4) its range of usage in the individual works of one author had to be clearly distinguished from, and not overlap, its range in the works of the other.

If in their use of a certain word, Greene and Chettle differed generally, one using the word in all forms and senses more frequently than the other, then all forms were brought together in a single count or "root-group" tabulation; as, for example, admire, admirable, admirably, and admiration are brought together as admire, root-group. But if they differed markedly in their usage only with respect to one sense, part of speech, or form of a word, then that sense, part of speech, or form was tabulated separately and retained as a marker, subject to the differentiation criteria.

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[1] Alternatively, we might have developed average rates of frequency of words in Elizabethan general usage and then ascertained those words in which Greene's or Chettle's usage diverged most from the norms. When enough texts of the Elizabethan period have been processed by computer and the mean frequencies of all words established, it will be possible to ascertain quite readily a given author's departures from the average usage of his time for a particular genre or type of prose. Ellegård, having "handpicked" his list of potential marker words and expressions, processed over a million words to determine the general 18th century usage, and then ascertained for each term the distinctiveness ratio between that average rate and the rate shown in the Junius letters and in the writings of Francis.

[2] Statistically taken as the minimum reliable rate for determining the characteristic frequency of a word for a particular author from a 100,000-word sample of his prose (Ellegård, A Statistical Method for Determining Authorship (Gothenburg, 1962), pp. 13-14).

An exhaustive comparative inventory was taken of the Greene and Chettle concordances. The methodology employed differs in this respect from that of Ellegård who pre-selected a list of likely candidates which he then tested for reliability, and also from the Mosteller-Wallace technique of screening potential markers through a series of testing "waves" of short texts.

To minimize the factor of contextuality, all words which might be expected to appear with unusual frequency because of the subject-matter (e.g., in Prodigal Son pamphlets, most obviously, *elder*, *younger*, *repent*) were eliminated from consideration. So also were auxiliary verbs and inflected verb forms as such, since the frequency of these words is largely predetermined by the writer's decision as to the tenses he will use; and so were personal pronouns, dependent on the relative prominence of male and female characters, the author's choice of point of view, and the relative amount of dialogue. In general, of course, the contextuality of a word in a given work is a function of the number of opportunities provided for its use by the subject-matter and the availability of synonymous alternatives. Thus *you* and *ye* were eliminated with the class of personal pronouns; but each writer's preference for *ye* or *you*, the alternatives being open to him, was noted and proved significant. The effect of difference of subject-matter and genre on the frequency of most words was clearly reflected in their greatly varying rates; consequently, the great ~~majority of~~ words not eliminated out of hand for contextuality were screened out by the criterion of low within-author variation. The words *desire*, *folly*, and *precept*, for example, frequent and clearly contextual in *Greene's Mourning Garment*, appear rarely by comparison in his *Discovery of Cosenage* and *Quip for an Upstart Courtier*, and were therefore automatically eliminated. Thus nouns as a class are highly contextual, but a noun like *comfort* is relatively low in contextuality for purposes of comparison, because of the numerous synonymous alternatives (*solace*, *cheer*, *content* or *contentment*, *ease*, etc.) available to the Elizabethan writer. The influence of context cannot, of course, be entirely avoided; but the aim was to have the process itself--the pre-established criteria--select the marker words, with the least possible intervention of subjective judgment or appraisal.

As expected, the overwhelming majority of words were used by Greene and Chettle at roughly the same average rates of frequency. Few met the pre-determined criteria of the rigorous screening process. Of several thousand different words appearing in the concorded text, 103 emerged, however, as potential marker words with distinctively different rates of use by the two writers.

A further process of validation of these potential marker-words against control texts was then instituted. Additional bodies of the two writers' works, "uncontaminated", since they had not been used to establish the prospective markers, were processed by the same computer programs--namely, Greene's *Farewell to Folly* (1590), and the only other extant writings of Chettle's known authorship, namely, four epistles, the blank verse play *The Tragedy of Hoffman*, and two brief additions by him to other plays. (The use of the blank verse drama texts was a necessity, for lack of other prose beyond the 1693 words of the four epistles; but using dramatic diction had the effect of making the control testing more rigorous.)

The Chettle control material was regarded as two separate control corpora: (1) the Tragedy of Hoffman as a single control unit (the first 15,000 words of the play); and (2) the four epistles, two dramatic scraps, and enough of Hoffman to constitute another total corpus of 15,000 words. For convenience in comparing counts with those of the Greene and Chettle corpora of 100,000 and 40,000 words, the Greene control corpus was similarly limited to the first 25,000 words of the Farewell to Folly. The results of comparing the frequencies of the prospective markers in the control texts with their rates in the Greene and Chettle corpora were encouraging. In a few cases the discrepancy was fairly large, but by far the greater number showed rates in the control texts for the two writers which did not differ greatly from those tentatively established as typical. As might have been expected because of the limitations imposed by the smaller size of the Chettle corpus and the lesser reliability of the Chettle control text, the divergences were greater for the Chettle plus-words than for those of Greene. The decision to limit the final list of marker words to the fifty showing the closest correspondence between the pre-established and the control text rates of frequency eliminated 17 of the Greene and 36 of the Chettle tentatively selected markers.

Thus 29 words most clearly favored by Greene, and 21 similarly favored by Chettle, emerged as discriminators of the Greene and Chettle patterns of lexical choice.[1]

Although statistically no one of these discriminators, however remarkable, might be considered significant, it might reasonably be assumed that the Greene and Chettle marker words as a group provided a valid test by which to determine Greene's or Chettle's probable authorship of a disputed work.

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[1] See Tables 1 and 2 in the following chapter.

# III

# PROCEDURES AND FINDINGS

## A. Lexical Choice Variables

### 1. Favored Words

Procedures. Differential Ratios expressing the relative frequency with which each writer used the Greene marker words and the Chettle marker words were separately calculated. The Greene favorites (Table 1) have a total frequency rate as a group of 8.44 per thousand words in Greene's own prose and a group rate of .975 in the Chettle corpus; the overall Differential Ratio in the two writers' use of these words is therefore 8.66. If Greene wrote the 11,000-word Groatsworth of Wit, we might expect it to show about 93 occurrences in the aggregate of these words that Greene consistently favored (8.44 x 11 = 92.8); and if Chettle wrote it, we might expect only 10 or 11 occurrences (.975 x 11= 10.7) of the Greene plus-words. For the Chettle favorites (Table 2), with total frequency rates of 9.425 in Chettle and 2.22 in Greene, the Differential Ratio of the group is 4.25. If Chettle wrote the Groatsworth the occurrences of the various words in this group should aggregate about 104 (9.425 x 11 = 103.7); and if Greene wrote it, they should total about 24 (2.22 x 11 = 24.4).

On the assumption that grouping the markers of each writer which showed comparatively high individual Differential Ratios would discriminate their styles still more effectively, group rates were calculated for the twenty-five Greene and ten Chettle favorites having Differential Ratios of 10 or higher.[1] For the Greene markers with these higher D.R.'s the total frequencies per thousand words are 5.53 in Greene's prose and only .05 in Chettle's, producing a group D.R. of 110.6; and for the Chettle higher D.R. markers, the total group frequencies are 3.275 in Chettle's prose and only .17 in Greene's, producing a group D.R. of 19.3. Finally, when the six Chettle markers with individual D.R.'s of 25 or higher are similarly grouped,[2] the total frequencies of 1.85 in Chettle and .05 in Greene produce a Differential Ratio of 36.5.

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[1] Greene: aim, bewray, brook, burst, courtesy, decipher, dump, fancy, feign, glance, insight, insomuch, marvel, measure, passing, perhaps, prick, smell, straight, stumble, taste, unless, wax, wench, wrap.

Chettle: admire, assure, beseech, however, hurt, immediate, preserve, remedy, reprove, rude.

[2] Chettle: beseech, however, hurt, immediate, reprove, rude.

## Table 1
## GREENE PLUS-WORDS

| Marker Word | | Occurrences in the Greene Corpus | Frequency per 1000 Words | Occurrences in the Chettle Corpus | Frequency per 1000 Words |
|---|---|---|---|---|---|
| aim | root group | 24 | .24 | 0 | 0 |
| bewray | root group | 17 | .17 | 0 | 0 |
| brook | verb | 17 | .17 | 0 | 0 |
| burst | verb | 11 | .11 | 0 | 0 |
| content | adjective | 44 | .44 | 3 | .075 |
| courtesy | root group | 70 | .70 | 1 | .025 |
| decipher | root group | 11 | .11 | 0 | 0 |
| dump(s) | noun | 16 | .16 | 0 | 0 |
| fancy | noun | 63 | .63 | 0 | 0 |
| feign | verb | 10 | .10 | 0 | 0 |
| glance | root group | 31 | .31 | 0 | 0 |
| grow=become | verb | 68 | .68 | 3 | .075 |
| humor | root group | 43 | .43 | 4 | .10 |
| insight | noun | 17 | .17 | 0 | 0 |
| insomuch | | 29 | .29 | 0 | 0 |
| marvel | root group | 18 | .18 | 0 | 0 |
| measure | verb | 22 | .22 | 0 | 0 |
| nor | | 136 | 1.36 | 27 | .675 |
| passing | adverb | 12 | .12 | 0 | 0 |
| perhaps | | 29 | .29 | 1 | .025 |
| prick | root group | 17 | .17 | 0 | 0 |
| smell | root group | 12 | .12 | 0 | 0 |
| straight = immediately | | 33 | .33 | 0 | 0 |
| stumble | root group | 13 | .13 | 0 | 0 |
| taste (fig.) | root group | 12 | .12 | 0 | 0 |
| unless | | 18 | .18 | 0 | 0 |
| wax = become | verb | 21 | .21 | 0 | 0 |
| wench | noun | 12 | .12 | 0 | 0 |
| wrap | verb | 18 | .18 | 0 | 0 |
| Totals | | 844 | 8.44 | 39 | .975 |

## Table 2
## CHETTLE PLUS-WORDS

| Marker Word | Occurrences in the Greene Corpus | Frequency per 1000 Words | Occurrences in the Chettle Corpus | Frequency per 1000 Words |
|---|---|---|---|---|
| admire root group | 2 | .02 | 12 | .30 |
| anything | 6 | .06 | 12 | .30 |
| assure root group | 6 | .06 | 24 | .60 |
| beseech root group | 1 | .01 | 11 | .275 |
| follow root group exc. adj. | 35 | .35 | 32 | .80 |
| gather* root group | 23 | .23 | 13 | .325 |
| however | 0 | .00 | 15 | .375 |
| hurt root group | 1 | .01 | 10 | .25 |
| immediate (-ly) | 1 | .01 | 15 | .375 |
| last (-ly) adj. & adv. | 11 | .11 | 26 | .65 |
| O interjection | 12 | .12 | 19 | .475 |
| pity noun | 6 | .06 | 16 | .40 |
| place noun | 52 | .52 | 49 | 1.225 |
| preserve root group | 2 | .02 | 10 | .25 |
| receive verb | 13 | .13 | 22 | .55 |
| remedy noun | 2 | .02 | 11 | .275 |
| reprove root group | 1 | .01 | 12 | .30 |
| reverend,-t (-ly) adj.&adv. | 3 | .03 | 11 | .275 |
| rude (-ly) | 1 | .01 | 11 | .275 |
| sometime(s) | 9 | .09 | 24 | .60 |
| while(-st) conjunction | 35 | .35 | 22 | .55 |
| Totals | 222 | 2.22 | 377 | 9.425 |

*The word gather was retained as a marker word, even though its overall Differential Ratio is 1.41, instead of 1.50, because the calculated frequency rate for Greene includes 9 highly contextual occurrences in *A Quip for an Upstart Courtier* in a single episode dealing with gathering herbs and flowers (pp. 214-218). Its average frequency in all other Greene texts is 0.15 per thousand words, which would produce a Differential Ratio of 2.17; and it does not occur at all in the Greene control text.

We thus had in these various statistical groupings of the words which most sharply differentiated the Greene and Chettle patterns of lexical choice, a series of authorship tests to be applied to the *Groatsworth of Wit*.

The comprehensive inventory of the two writers' vocabularies had brought to light some notable specific cases of markedly different lexical usage. The most remarkable is in the use of *however*. In the **entire corpus of 100,000 words Greene never** once uses the word, consistently writing *howsoever* instead; Chettle, on the contrary, not only uses *however* frequently, and in various ways, but prefers it to *howsoever* by a margin of 15 to 1. Actually, the difference is greater still: Greene uses none of the other *-ever* forms, either; in marked contrast to Chettle, he habitually chooses the *-soever* form in every case (see Table 3). A visual scanning of the approximately 600,000 words of Greene's prose not included in the test corpus failed to turn up a single occurrence of *however* or of any of the other *-ever* forms.

Table 3
Occurrences of *-ever* and *-soever* Forms
in Test Corpora

| | *-ever* forms (however, whatever, etc.) | *-soever* forms (howsoever, whatsoever, etc.) |
|---|---|---|
| Greene | 0 | 43 |
| Chettle | 22 | 7 |

Another notable marker is the word *reprove* in all its forms. Clearly a constant favorite with Chettle, it occurs 12 times in the Chettle corpus, appearing in every individual work--4 times in *Kind-Heart's Dream*, 6 times in *Piers Plainness*, and twice in *England's Mourning Garment*--and in each of his two longer epistles. Greene, on the other hand, almost totally neglects the word, using it only once in 100,000 words, and then (N063 19) apparently only because he needed it as a rhyme; he prefers *censure*, *condemn*, *blame*, and *reproach*, which he uses 15, 10, 6, and 3 times respectively. Chettle uses all of these, and also *admonish*, *rebuke*, and *reprehend*, but he decidedly prefers *reprove*. The Differential Ratio between the two writers for *reprove* (root group) is 30 to 1. The verb *brook*, on the other hand, is a particularly marked favorite with Greene, whereas Chettle never uses it, preferring *tolerate* (which Greene does not use, at least in the test corpus) and other synonyms. Chettle not only uses *assure* (root group) at ten times the Greene rate, but he uses such forms as *assurance* and *assurancer*, which do not occur in Greene. For the meaning of "immediately, at once", Greene overwhelmingly prefers *straight*, using it 33 times to a single instance of *immediately*; Chettle, on the contrary, uses immediately every time (15 cases) and never uses straight in this sense. And other such striking differences in the two writers' usage of individual words might be cited.

Certainly among their most significant divergencies are Greene's and Chettle's contrasting preferences in the forms of the interjection O and Oh--and in the forms of the second person pronoun--ye and you. In the following tabulation (Table 4), Latin and noun uses of O were of course not included, but the 6 uses of O by Greene in invocations to the deity were included, though the liturgical O was conventional;[1] if these are omitted, the differential is even more marked.

Table 4
Alternative Forms of Interjection

| | O | Oh | % O | %Oh |
|---|---|---|---|---|
| Greene | 13 | 44 | .23 | .77 |
| Chettle | 19 | 1 | .95 | .05 |

For the pronoun choice, the contrast is even more striking. As noted above, the frequency of a writer's use of any given pronoun is largely contextual; here, however, it is a matter of the use of two forms of the same pronoun, and we are regarding as significant, not the total number of occurrences, but the writers' widely varying ratios in using one or the other of the alternative forms. In his studies of the Beaumont and Fletcher canon, Cyrus Hoy found that varying practices in the use of ye and you provided by far his best linguistic evidence for authorship[2]. And here Greene's sparing use of the colloquial ye sets him off most distinctively from Chettle (Table 5).

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[1] The consistent observance of this conventional distinction, incidentally, and the consistency of the data for works printed at different printing houses, indicate that compositors were faithful to the author's copy in the matter of interjections.

[2] Studies in Bibliography, VIII (1956), 142. Hoy presents (p. 138) the evidence that compositors carefully preserved the author's usage of ye and you; and again the consistency of the Greene and Chettle rates in books printed at various printing houses shows that this was so.

Table 5
Alternative Forms of Second Person Pronoun

| | ye | you | % of ye |
|---|---|---|---|
| Greene | 3 | 637 | .005 |
| Chettle | 62 | 100 | .383 |

Findings. The suite of computer programs having been run on the Groatsworth of Wit, the occurrences of the Greene and Chettle marker words in the Groatsworth were tabulated from the concordance output; and the frequency of each word was expressed as the number of its occurrences per thousand words of the Groatsworth text. These frequencies were then compared in turn with those that had been found characteristic of Greene and Chettle. The resulting data are shown in Tables 6 and 7.

The 29 words on the Greene marker list, the words most distinctively favored by Greene in comparison with Chettle, appear a total of 22 times in the 11,000-word Groatsworth of Wit, an average rate of 2.00 occurrences per thousand words. This is far lower than the characteristic Greene frequency, which was an average of 8.44 occurrences per thousand words over the Greene corpus; and far below the approximately 93 occurrences to be expected if Greene wrote the book. The result of matching the Greene marker words to the purported Greene work is decidedly negative for his authorship. At the same time, these Greene favorites turn up in the Groatsworth twice as often as they usually do in Chettle's writings; at Chettle's average rate of .975 per thousand for these words as a group, only about 11 occurrences, instead of 22, might have been expected on the hypothesis of his authorship.

The 21 Chettle markers, the words he most distinctively favors in comparison with Greene, appear a total of 102 times in the Groatsworth, an average rate of 9.273 per thousand. This conforms very closely indeed to Chettle's characteristic rate of 9.425, which led to the expectation of about 104 occurrences on the hypothesis of his authorship. Since, moreover, Greene uses these Chettle favorites as a group at the rate of only 2.22 per thousand, this is strongly positive evidence for Chettle's authorship of the Groatsworth of Wit.

Of the 29 individual Greene marker words, only 11 appear in the Groatsworth, whereas of the 21 Chettle favorites, 18 turn up in the Groatsworth .

When the frequencies of the groups of Greene and Chettle plus-words with Differential Ratios of 10 or higher were similarly compared with their frequencies in the Groatsworth, the higher differential Greene

## Table 6
## GREENE PLUS-WORDS

| Marker Word | | Occurrences in the Greene Corpus | Frequency per 1000 Words | Occurrences in the Chettle Corpus | Frequency per 1000 Words | Occurrences in the *Groatsworth of Wit* | Frequency per 1000 Words |
|---|---|---|---|---|---|---|---|
| aim | root group | 24 | .24 | 0 | 0 | 1 | .09 |
| bewray | root group | 17 | .17 | 0 | 0 | 0 | 0.00 |
| brook | verb | 17 | .17 | 0 | 0 | 0 | 0.00 |
| burst | verb | 11 | .11 | 0 | 0 | 0 | 0.00 |
| content | adjective | 44 | .44 | 3 | .075 | 2 | .18 |
| courtesy | root group | 70 | .70 | 1 | .025 | 1 | .09 |
| decipher | root group | 11 | .11 | 0 | 0 | 0 | 0.00 |
| dump(s) | noun | 16 | .16 | 0 | 0 | 1 | .09 |
| fancy | noun | 63 | .63 | 0 | 0 | 4 | .36 |
| feign | verb | 10 | .10 | 0 | 0 | 1 | .09 |
| glance | root group | 31 | .31 | 0 | 0 | 1 | .09 |
| grow=become | verb | 68 | .68 | 3 | .075 | 5 | .45 |
| humor | root group | 43 | .43 | 4 | .10 | 0 | 0.00 |
| insight | noun | 17 | .17 | 0 | 0 | 0 | 0.00 |
| insomuch | | 29 | .29 | 0 | 0 | 3 | .27 |

### Table 6
### GREENE PLUS-WORDS (continued)

| Marker word | | Occurrences in the Greene Corpus | Frequency per 1000 Words | Occurrences in the Chettle Corpus | Frequency per 1000 Words | Occurrences in the *Groatsworth of Wit* | Frequency per 1000 Words |
|---|---|---|---|---|---|---|---|
| marvel | root group | 18 | .18 | 0 | 0 | 0 | 0.00 |
| measure | verb | 22 | .22 | 0 | 0 | 0 | 0.00 |
| nor | | 136 | 1.36 | 27 | .675 | 2 | .18 |
| passing | adverb | 12 | .12 | 0 | 0 | 0 | 0.00 |
| perhaps | | 29 | .29 | 1 | .025 | 0 | 0.00 |
| prick | root group | 17 | .17 | 0 | 0 | 0 | 0.00 |
| smell | root group | 12 | .12 | 0 | 0 | 0 | 0.00 |
| straight=immediately | | 33 | .33 | 0 | 0 | 0 | 0.00 |
| stumble | root group | 13 | .13 | 0 | 0 | 0 | 0.00 |
| taste (fig.) | root group | 12 | .12 | 0 | 0 | 0 | 0.00 |
| unless | | 18 | .18 | 0 | 0 | 0 | 0.00 |
| wax=become | verb | 21 | .21 | 0 | 0 | 1 | .09 |
| wench | noun | 12 | .12 | 0 | 0 | 0 | 0.00 |
| wrap | verb | 18 | .18 | 0 | 0 | 0 | 0.00 |
| Totals | | 844 | 8.44 | 39 | .975 | 22 | 2.00 |

Table 7
CHETTLE PLUS-Words

| Marker Word | Occurrences in the Greene Corpus | Frequency per 1000 Words | Occurrences in the Chettle Corpus | Frequency per 1000 Words | Occurrences in the Groatsworth of Wit | Frequency per 1000 Words |
|---|---|---|---|---|---|---|
| admire root group | 2 | .02 | 13 | .30 | 2 | .18 |
| anything | 6 | .06 | 12 | .30 | 7 | .64 |
| assure root group | 6 | .06 | 24 | .60 | 7 | .64 |
| beseech root group | 1 | .01 | 11 | .275 | 4 | .36 |
| follow root group exc. | 35 | .35 | 32 | .80 | 7 | .64 |
| gather root group adj. | 23 | .23 | 13 | .325 | 7 | .64 |
| however | 0 | 0.00 | 15 | .375 | 6 | .545 |
| hurt root group | 1 | .01 | 10 | .25 | 2 | .18 |
| immediate(-ly) | 1 | .01 | 15 | .375 | 0 | 0.00 |
| last(-ly) adj. & adv. | 11 | .11 | 26 | .65 | 12 | 1.09 |
| O interjection | 12 | .12 | 19 | .475 | 10 | .91 |
| pity noun | 6 | .06 | 16 | .40 | 2 | .18 |
| place noun | 52 | .52 | 49 | 1.225 | 7 | .64 |
| preserve root group | 2 | .02 | 10 | .25 | 0 | 0.00 |
| receive verb | 13 | .13 | 22 | .55 | 5 | .40 |
| remedy noun | 2 | .02 | 11 | .275 | 3 | .27 |
| reprove root group | 1 | .01 | 12 | .30 | 8 | .73 |
| reverend,-t(-ly)adj. & adv. | 3 | .03 | 11 | .275 | 0 | 0.00 |
| rude (-ly) | 1 | .01 | 11 | .275 | 2 | .18 |
| sometime(s) | 9 | .09 | 24 | .60 | 3 | .27 |
| while(-st) conjunction | 35 | .35 | 22 | .55 | 8 | .73 |
| Totals | 222 | 2.22 | 377 | 9.425 | 102 | 9.273 |

markers, with a group frequency rate of 5.53 in the Greene corpus, were found occurring only 13 times, or at the much lower rate of 1.18, in the questioned work; the higher differential Chettle markers, on the contrary, with a group frequency of 3.275 in the Chettle corpus, occur 34 times, or at the very similar rate of 3.091 in the Groatsworth.

The various indications that the Groatsworth reflects the Chettle pattern of word-choice, rather than Greene's, were underscored when the top six Chettle markers, the words favored in comparison to Greene by a margin of over 25 to 1, were separated out. This group-- beseech, however, hurt, immediate, reprove, and rude -- which has an aggregate rate of only .05 per thousand words in Greene compared with 1.85 in Chettle, has a rate of 2.00 in the Groatsworth (Table 8). On the hypothesis of Chettle's authorship, a total of 20 occurrences (1.85 x 11 = 20.4) of some or all of his most highly favored words might have been expected in the Groatsworth; and they actually occur 22 times. Taken together, they appear almost four and one-half times as often in the 11,000-word Groatsworth as they do in the entire Greene corpus of 100,000 words; their occurrence rate in the Groatsworth is 40 times their average frequency in Greene, but almost identical with their frequency in Chettle.

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Table 8
Chettle Markers of Highest Frequency

Tabulation of Occurrences

| Marker Word | Greene Corpus 100,000 Words | Chettle Corpus 40,000 Words | Groatsworth of Wit 11,000 Words |
|---|---|---|---|
| beseech | 1 | 11 | 4 |
| however | 0 | 15 | 6 |
| hurt | 1 | 10 | 2 |
| immediate (-ly) | 1 | 15 | 0 |
| reprove | 1 | 12 | 8 |
| rude | 1 | 11 | 2 |
| Totals | 5 | 74 | 22 |
| Frequency per 1000 Words | .05 | 1.85 | 2.00 |

Further telling evidence of Chettle's pattern of lexical choice in the Groatsworth appears when we look at some of the most distinctive marker words. Greene, as we have seen, never throughout the 100,000-word corpus, or elsewhere in his prose writings so far as we know, uses any of the combinative conjunctive-adverb forms in -ever, invariably employing instead the equivalent -soever forms. Yet the author of the Groatsworth not only uses the -ever forms, but he prefers them, as does Chettle, more than three-fourths of the time (see Tables 9 and 10).

This is the strongest single piece of lexical evidence and one that is highly persuasive to common experience, however limited it may be in its statistical significance; it is difficult to conceive that Greene would reverse his lifetime practice in this way, much less shift to almost precisely the Chettle pattern in using these words. The writer of the Groatsworth also reflects Chettle's higher frequency of the -ever and -soever forms combined. Against Greene's total rate of .43 per 1000 words, Chettle has .67, and the Groatsworth 1.09.

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Table 9
Occurrences of -ever and -soever Forms

| | Greene | Chettle | Groatsworth |
|---|---|---|---|
| however | 0 | 15 | 6 |
| whatever | 0 | 6 | 4 |
| whenever | 0 | 0 | 0 |
| wherever | 0 | 1 | 0 |
| whoever | 0 | 0 | 0 |
| whomever | 0 | 0 | 0 |
| Totals | 0 | 22 | 10 |
| howsoever | 20 | 1 | 2 |
| whatsoever | 15 | 3 | 0 |
| whensoever | 1 | 0 | 0 |
| wheresoever | 5 | 1 | 0 |
| whosoever | 1 | 1 | 0 |
| whomsoever | 1 | 1 | 0 |
| Totals | 43 | 7 | 2 |

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Table 10

Frequencies of -*ever* and -*soever* Forms

| -*ever* Forms | Greene | Chettle | *Groatsworth* |
|---|---|---|---|
| Occurrences | 0 | 22 | 10 |
| Per 1000 words | 0.00 | .51 | .91 |
| % -*ever* forms | 0 | 76 | 83 |
| -*soever* Forms | | | |
| Occurrences | 43 | 7 | 2 |
| Per 1000 Words | .41 | .16 | .18 |
| % -*soever* forms | 100 | 24 | 17 |

The word *reprove*, an unmistakable Chettle favorite, which Greene unaccountably *neglects*, using it only once (when he needs a rhyme), appears 8 times in the *Groatsworth*; and as Chettle has *reproof* and *unreprovable*, the *Groatsworth* has *reproof* and *unreproved*. Similarly, the word *assure* (root group), which Chettle uses at ten times Greene's rate, appears 7 times in the *Groatsworth*, more often than it appears in the entire Greene corpus, and at a rate of frequency slightly higher than that found in the Chettle corpus; like Chettle, the writer of the *Groatsworth* uses the noun *assurance*, which does not occur in Greene. And *admire* (root group), which Chettle uses at a rate fifteen times that of Greene, appears as often in the *Groatsworth* as in the whole Greene corpus. The word *comfort* (root group), which has been noted impressionistically as a word for which Chettle shows "a marked partiality"[1], but which narrowly failed to meet our criteria for marker words, has a frequency rate of .17 in Greene, .58 in Chettle, and .73 in the *Groatsworth*. Greene uses *perhaps* 29 times, *perchance* only once; Chettle *perhaps* only once, and *perchance* 5 times; on the one occasion in the *Groatsworth* where the choice presented itself, the writer chose *perchance*. Neither *straignt* nor *immediately* appears in the *Groatsworth*. *Following* does not occur at all as a postpositive adjective in Greene; it so occurs 4 times in Chettle; and also occurs in the *Groatsworth* ("these few rules following"--G041 09).

Greene and Chettle contrast sharply in their use of the two forms of the interjection--*O* and *Oh*; and usage in the *Groatsworth* corresponds with Chettle's in overwhelmingly favoring the *O* form (Table 11).

Most striking is the contrast (not shown in the list of markers because of the exclusion of personal pronouns in the screening process) in the use by Greene and Chettle of the forms of the second person pronoun. Greene uses the colloquial *ye* only one-half of one percent of the times he uses the second person pronoun, singular or plural, as compared with Chettle's thirty-eight percent. And the usage of *ye* in the *Groatsworth* is clearly of the Chettle order of magnitude (Table 12).

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[1] H. Dugdale Sykes, *Notes and Queries*, 12th Series, XII, 265.

Table 11
Alternative Forms of Interjection

| | Greene | Chettle | *Groatsworth* |
|---|---|---|---|
| *O* | 13 | 19 | 9 |
| *Oh* | 44 | 1 | 0 |
| % of *O* | .23 | .95 | 1.00 |
| % of *Oh* | .77 | .05 | 0.00 |

Table 12
Alternative Forms of Second Person Pronouns

| | Greene | Chettle | *Groatsworth* |
|---|---|---|---|
| *ye* | 3 | 62 | 23 |
| *you* | 637 | 100 | 100 |
| % of *ye* | .005 | .383 | .187 |

## 2. High-Frequency Words

A separate study was made of the very common words variously known as function, grammar, and "filler" words. It was not to be expected that any two writers would vary greatly in their use of this linguistic small change; and sharply differing views have been expressed by quantitative linguists on the usefulness of these high-frequency terms as stylistic discriminators. Mosteller and Wallace considered such words best for the purpose because their frequency rates are most likely to be consistent throughout a writer's work, least likely, that is, to be affected by varying content; and they found that a few function words showed such distinctively different patterns of frequency in the works of Madison and Hamilton as to make it statistically possible by their means to determine the authorship of the disputed *Federalist Papers*. Ellegård and Herdan, on the other hand, have questioned the evidential value of findings based on these high-frequency words.

The question obviously deserves further study and possession of complete verbal indexes and concordances to our texts provided an excellent opportunity. We had not followed the usual custom of deleting from computer generation articles and other very common words; and in this, especially in the retention of prepositions, we had the additional motive of wishing to exploit the possibilities of syntactical study.

Procedures. The problem of selecting a limited number of high-frequency words for study, without handpicking the list, was resolved by the decision to confine the initial scrutiny to the 70 such words taken by Mosteller and Wallace from the Miller-Newman-Friedman word counts, plus 19 words they had added from a random sample of function words, and the like.[1] We thus had an unbiased selection of high-frequency words.

From this list of 89 words, all pronouns, verb forms, and verbal auxiliaries, amounting in all to 28, were eliminated as relatively high in contextuality, on the basis of the Mosteller-Wallace findings; and two other words (things and second) were also discarded on this ground, reducing the list to 59.[2] To these words the following criteria were then applied: frequency rate of at least one occurrence per thousand words; Differential Ratio between the Greene and Chettle average frequencies of at least 1.25; low between-writings variation within each author's work; and very little overlap, if any, in the two writers. Not unexpectedly, some words of the very highest frequency failed to satisfy these criteria; the article the, for example, showed practically no difference in pattern of frequency in these authors. But other words in this category did; and thus a and and, for example, are included in this test. The final list of 17 qualifying words included nor, which had emerged from our overall screening for favored words as a marker with a high Differential Ratio. The frequency rates of these words range from 36 per thousand words of text down to 1.20, their Differential Ratios from a high of 2.33 to a low of 1.26. The five words having frequencies of 5 or more per thousand -- a, and, as, by, and so -- appeared the most likely to show significantly different patterns of frequency distribution in the two writers. Of the 17, eleven have higher frequencies in Greene and six in Chettle (See Table 13).

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[1] Mosteller and Wallace, Inference and Disputed Authorship: The Federalist, p.38. Words marked with an asterisk on the Mosteller-Wallace list of additional words came from their screening study of Madison and Hamilton texts and were not included.

[2] The list at this stage was as follows: a, all, also, although, among, an, and, another, any, as, at, because, between, both, but, by, down, either, even, every, for (separately, preposition and conjunction), from, if, in, into, more, no, nor, not, now, of, often, on, only, or, perhaps, same, so, some, still, such, those, than, that, the, then, there, this, to, under, up, upon, what, when, where, whether, which, who, with.

A computer program was written to count off the texts into 1000-word blocks--100 for the Greene corpus, 40 for the Chettle, and 11 for the Groatsworth of Wit. These blocks were numbered consecutively for each author. Then for each word the number of its occurrences in each 1000-word block was tallied. The decision having been made to take 2000-word segments of text as our unit for the measurement of frequency variation, a table of random numbers was used to select the 1000-word blocks to be taken together to form the larger units. The total number of occurrences of each word in each of these randomly selected 2000-word units having been tabulated,[1] the distribution of the tallied frequencies was then charted. Finally, to facilitate comparison the figure for the total number of blocks falling into each frequency interval was converted into the percentage of blocks in the prose of each author that exhibited the stated frequency. (For tables showing the distribution of rates of occurrence for each of the 17 high-frequency words, see Appendix D).

Findings. Of the 17 words, 14 have patterns of frequency-distribution in the Groatsworth of Wit similar to their patterns in the Chettle corpus; and these include the 5 words of highest frequency, those identified as presumably the most reliable discriminators--namely, a, and, as, by, so. Two words--some and only--which are in the two per thousand and one per thousand frequency rate categories respectively, show patterns in the Groatsworth which are much closer to Greene's, and one word--no--is not significantly closer to one than the other.

When the Greene plus and the Chettle plus high-frequency words were tested as groups against the Groatsworth (see Table 13), the aggregate frequency for the Greene group was 95.73 in the Greene corpus as compared to an aggregate frequency in the Groatsworth for these words of 65.45, while the aggregate frequency for the Chettle group was 21.73 in the Chettle corpus as compared to 21.08 in the Groatsworth.

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[1] Only five 2000-word blocks were taken from the 11,000-word Groatsworth.

## Table 13
High-Frequency Discriminators
Rates per 1000 words

| Greene Plus-Words | | | Chettle Plus-Words | | |
|---|---|---|---|---|---|
| Word | Greene | Groatsworth | Word | Chettle | Groatsworth |
| a | 21.90 | 16.73 | by | 6.69 | 7.18 |
| and | 36.62 | 25.09 | no | 4.77 | 4.09 |
| as | 12.52 | 8.27 | now | 2.06 | 3.18 |
| down | 1.20 | 0.64 | only | 1.92 | 1.18 |
| nor | 1.36 | 0.18 | some | 2.82 | 1.18 |
| so | 7.89 | 7.18 | which | 3.47 | 4.27 |
| such | 3.97 | 1.18 | | | |
| then | 3.24 | 2.36 | | | |
| up | 1.80 | 0.64 | | | |
| upon | 1.86 | 0.82 | | | |
| when | 3.37 | 2.36 | | | |
| Totals | 95.73 | 65.45 | Totals | 21.73 | 21.08 |

### 3. Uncommon Words

Procedures. The uncommon words, or senses of words, an author uses may be as distinctive a feature of his pattern of lexical choice as the comparatively common words he characteristically favors. It was the object of this test, therefore, to ascertain the relatively uncommon words used by the writer of the Groatsworth of Wit; and then to match these against the concorded vocabularies of Greene and Chettle. The assumption was that such words having been found, few if any might be expected to appear in the prose of one who had not written the Groatsworth, but that some might well be expected to turn up again in the known prose of one who had. Such uncommon words would constitute an additional set of criteria for the unknown writer's work.

In the lack as yet of an index verborum for general Elizabethan or sixteenth century English prose, it is difficult to assert the uncommonness of a word with any assurance, since no wholly adequate negative check of such an assertion can be made. For the purpose of this test it was decided, consequently, to qualify as unusual those words or senses which satisfied predetermined, objective standards of relative uncommonness in the general usage of the time. The list of such usages in the Groatsworth was of course compiled independently, and without reference to the verbal indexes and other computer-produced orderings of the Greene and Chettle vocabularies. The procedure adopted was as follows: In repeated readings of the Groatsworth of Wit, every word, and every sense of a word, which long acquaintance with Elizabethan literature suggested might possibly have been uncommon in the general literary vocabulary of the time was extracted and tentatively listed. No word with any remote possibility of ultimately qualifying was passed over; consequently, a large number of words and senses were at first listed (e.g., abject as a noun and apostata for apostate) which the investigator was virtually certain would prove upon closer scrutiny to have been not at all uncommon Elizabethan usages. This preliminary list, which contained 370 words and senses, was then checked by reference to the Oxford English Dictionary; and this process, as expected, eliminated over three-fourths of the words from further consideration. It was then checked against all available concordances to Elizabethan writers--namely, concordances to the works of Donne, Kyd, Marlowe, Shakespeare, and Spenser--and also against the very full glossarial indexes to R. B. McKerrow's edition of Nashe and to the Dodsley and Farmer editions of old plays, as well as against several brief glossaries to editions of sixteenth century writers.

The primary basis for final determination of the uncommon usages was the information recorded in the OED; and a word or sense which met any of the following criteria was retained unless the evidence of concordances and glossaries indicated that the usage in question was actually not as uncommon as the OED entry suggested: (1) It is not listed in the OED; (2) the earliest OED citation is to its appearance in the Groatsworth itself; (3) the earliest citation is to a work later than the Groatsworth; (4) it was archaic or obsolete in 1592; (5) it was a new usage in 1592, which might be expected to have been adopted by some writers, but not yet by others; (6) it appears to have been fairly uncommon, to judge by the evidence of concordances and glossaries alone.

It must be conceded that further investigation might bring into question the status of some of the words selected on these bases. On the whole, however, this procedure seemed a reasonably valid means of sifting from the total vocabulary of the Groatsworth the writer's least common words and word senses. And the thirty-three words or senses that met one or another of these criteria (see Table 14) were qualified as touchstones for comparison with the Greene and Chettle vocabularies.

Findings. A check of these thirty-three words against the aggregate Greene concordance revealed that the purported author of the *Groatsworth of Wit* did not use a single one of them in the 104,600-word corpus of his prose; nor in the whole of the 28,000-word Greene control text, *Farewell to Folly*; nor elsewhere in his writings, so far as can be told from the Glossarial Index to his complete works[1] and a visual scanning of the rest of his prose. It seems particularly negative for his authorship that in a long writing career--and in over 700,000 words--he should not have used any of the distinctive usages which appear two or more times in the *Groatsworth*, namely, *consort*, *crank*, and *however*, in the specified senses, *newcomer*, *reasonless*, and *relentless*. The repeated use of these words by the writer of the *Groatsworth* suggests that they were characteristic of his diction and might be expected to turn up in any fairly large sample of his writing. (The word *however* is of course especially interesting; already known not to have been used by Greene in any sense, it not only appears in the *Groatsworth*, but is used quite distinctively, as the quotations show, in the purported Greene preface.) It is noteworthy, too, that *brothel*, found in the *Groatsworth* in the sense of "prostitute", is not among the more than a score of synonyms for prostitute in Greene's writings.

Chettle, by contrast, uses five of the relatively uncommon *Groatsworth usages*, including four of those just mentioned; as follows: *amber-colored* (P134 11); *consort*, verb (P127 10; P166 17); *however*, OED sense 1.c. (K013 14; K044 13; P165 15, etc.); *reasonless* (E099 12); and *relentless* (P138 10). And at about the time of the *Groatsworth*, in his epistle to *Gerileon*, Chettle used another in calling the printer Jeffes a "wainscot fac'd fellowe" (WA4R 24); similarly, the infatuated Lucanio is described as "striving to sett a countenance on his new turnd face, that it might seeme of wainscot proofe, to beholde her face without blushing" (G017 27). The notion of brazenly maintaining a "blushles face" (K024 18) seems to have been much on Chettle's mind at the time.

Chettle uses *however* very much as we find it used in the *Groatsworth*; this is a characteristic habit, of which a few of the many examples may be quoted: "how ever Playes are not altogether to be commended: yet some of them [critics of the stage] do more hurt in a day, than all the players (by exercizing theyr profession) in an age" (K044 13); "How ever I have seemed to live secure, yet against this expected day of my downefall have I not been altogether improvident" (P165 15); "Women will like however they say noe" (*Hoffman*, line 1912).

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[1] Grosart's Glossarial Index is unreliable, however, as a guide to Greene's less common usages. It fails, on the one hand, to notice many such usages and, on the other, very often glosses ordinary Elizabethan words and senses. To be especially noted also is the fact that all entries in this glossary cited from Volume XII, pp. 97-188, are of words in the questioned *Groatsworth* and *Repentance*, about the authenticity of which Grosart refused to entertain any doubt.

### Table 14
### Uncommon Words
### in the Groatsworth of Wit

| Word | Criterion | Page & Line | Context | Comment |
|---|---|---|---|---|
| amber-colored | 3 | 20.14 | this yoong man ... made mute with the celestiall organs of your voyce and feare of that rich ambush of amber-colored dartes [Lamilia's hair] | Earliest OED citation is Love's Labour's Lost, now generally dated somewhat later than the Groatsworth. |
| antiquary | 2 | 7.04 | an Iland ... the name is not mentioned in the Antiquarie, or else worne out by times Antiquities. | OED cites Groatsworth first and gives the sense as "antiquity"; but possibly it is rather "old chronicle". |
| arch-playmaking-poet | 1 | 36.07 | But Roberto now famozed for an Arch-plaimaking-poet | nonce word |
| bow-bent | 2 | 17.28 | Anone he would stroke his bow-bent-leg | OED: s.v. bow sb.[1] 19. bow-bent a., bent like a bow, bowed. |
| brothel (in original sense of a person) | 6 | 37.13 | The shamefull ende of sundry his consorts ... of which one, brother to a Brothell he kept ... | OED: sb. 2. An abandoned woman, a prostitute. Obs. [Not yet obsolete in 1592, but a relatively uncommon term for a prostitute; earliest citation for present sense is 1593] |

Table 14
Uncommon Words
in the Groatsworth of Wit (continued)

| Word | Criterion | Page & Line | Context | Comment |
|---|---|---|---|---|
| consort (verb, "to keep company") | 5 | 14.18<br>31.15 | With one of these female serpents Roberto consorts ... thinkst thou Lamilia so loose to consort with one so lewd | OED:v. "found first in end of 16th c." 1. trans. earliest citation Love's Labour's Lost 2. intrans. Earliest cit. Hakluyt, 1588-89. |
| crank adj. | 6 | 21.13<br>35.04 | My yong master waxed crancke ... was very forward in dauncing ... having founde a vaine to finger crowns, he grew cranker | OED: crank, a.$^1$ 2. Lively, brisk, in high spirits, 'cocky'. |
| fool-holy adj. | 2 | 12.13 | So foole-holy as to make scruple of conscience | OED: s.v. Fool sb.$^1$ and a. 5e. similative, as ... fool-bold, ... fool-holy. [Only Groatsworth cited] |
| Friday-face | 2 | 23.07 | made a Friday face, counter-feiting sorrow. | OED: s.v. Friday 3. attrib. and Comb. Friday-face, a grave or gloomy expression of the countenance: whence Friday-faced a. sad-looking [Groatsworth is earliest citation] |

Table 14
Uncommon Words
in the Groatsworth of Wit (continued)

| Word | Criterion | Page & Line | Context | Comment |
|---|---|---|---|---|
| gold-wrought | 3 | 18.03 | a gold wrought handkercher | OED: s.v. gold II. attrib. and comb. 9. c. [Earliest citation in 1625.] |
| gracer | 2 | 43.16 | thou famous gracer of Tragedians | OED: One who graces or gives grace to [Groatsworth earliest citation] |
| green-springing | 1 | 49.23 | My wretched end may warn Greene springing youth | OED: s.v. green adj. III. [Many compounds are cited, but not green-springing.] |
| home-breeding adj. | 3 | 32.13 | such false Syrens, those home-breeding foes | OED. s.v. home sb.$^1$ and a. 14. attrib. and Comb. [Cites only a substantive use in 1865] |
| hospital (in sense of "a house of entertainment") | 4 | 16.09 | the house where Lamilia (for so we call the Curtizan) kept her hospitall | OED: s.v. hospital sb. 4. a house of entertainment: 'open house'. Cites c. 1400, then Groatsworth. |

Table 14
Uncommon Words
in the Groatsworth of Wit (continued)

| Word | Criterion | Page & Line | Context | Comment |
|---|---|---|---|---|
| however adv. | 6 | 6.07<br>6.12 | How ever yet sicknesse, riot, incontinence, have at once shown their extremitie, yet if I recover ...<br>how ever I have been censured for some of my former bookes, yet Gentlemen I protest, they were as I had speciall information. | OED: s.v. however adv. 1. c. However much: notwithstanding that; although. Obs. or arch. [Citations from Spenser's Tears of the Muses and from King Lear] |
| ill-gathered | 1 | 7.13 | his il gathered goods | OED lists a very large number of compounds with ill-, but not this one. |
| long-laid-up | 1 | 14.02 | his long laid up store | OED lists a large number of compounds with long-, but not this one. |
| mites-worth | 2 | 39.10 | Greene will send you now his groats-worth of wit, that never shewed a mites-worth in his life | OED: s.v. mite$^2$ 1.b. [Groatsworth earliest citation] |

Table 14
Uncommon Words
in the *Groatsworth of Wit* (continued)

| Word | Criterion | Page & Line | Context | Comment |
|---|---|---|---|---|
| *newcomer* | 2 | 30.09 | advisde his brother ... to *furnish* himselfe with more crownes, least hee were outcrackt with new commers. | *OED:* cites *Groatsworth*; then a citation from 1637 |
| | | 46.16 | For other new-commers, I leave them to the mercie of these painted monsters | |
| *outcountenance* | 6 | 30.10 | *Lucanio*, loath to be outcountenanst, followed his advise | *OED*: *v*. *Obs*. Cites Bright, 1586: then Florio, 1603. [*Outface* was the usual word.] |
| *outcrack* | 2 | 30.08 | (See *newcomer*.) | *OED*: *v*. *Obs*. To make a louder crack or noise than; to outbrag. [Cites *Groatsworth*, then 1602.] |
| *reasonless* | 6 | 31.10 | Reasonlesse Roberto, that having but a brokers place, askest a lenders reward. | *OED*: 2. Devoid of ordinary reason; senseless. [Cites Hoccleve 1421, then *Groatsworth*.] |
| | | 31.28 | Lucanios impatience ... forbad all reasoning with them that was reasonlesse | |
| *recurelessly* | 2 | 31.09 | untill hee perish recurelesly wounded | *OED*: *adv*. incurably, [*Groatsworth* earliest citation.] |

## Table 14
Uncommon Words
in the Groatsworth of Wit (continued)

| Words | Criterion | Page & Line | Context | Comment |
|---|---|---|---|---|
| relentless | 2 | 9.03 | But death is relentlesse, and will not be intreated: witless ... | OED: a. [Groatsworth earliest citation, then 1602] |
| | | 24.18 | ... perceiving her relentlesse shewed themselves not altogether witlesse | |
| | | 49.03 | Use no intreats, I will relentlesse rest | |
| Shake-scene | 2 | 46.01 | in his owne conceit the onely Shake-scene in a countrey | OED: arch. rare (Of uncertain or vague meaning: used by Greene in his attack on Shakespeare.) |
| shallow-witted | 3 | 30.19 | so well read, and yet shewe your selfe so shallow witted | OED: s.v. shallow adj. 8 Comb. [Only citation is 1656.] |
| sinlock | 1 | 11.06 | repentance of his sinn-loke | Not listed in OED and not found elsewhere. Cf. wedlock. |
| sun-darkening | 1 | 20.12 | the beautie of your sunne darkening eies | OED lists many combinations with sun, but not this one. |

### Table 14
### Uncommon Words
### in the Groatsworth of Wit (continued)

| Words | Criterion | Page & Line | Context | Comment |
|---|---|---|---|---|
| trickly | 6 | 27.15 | trickly attyred | OED: adv. b. Neatly, smartly, finely. [Two citations earlier than Groatsworth.] |
| unseamed | 2 | 35.14 | his shooes unseamed | OED cites Groatsworth as earliest, then Macbeth. |
| wainscot (descriptive of a face, meaning "unabashed, brazen") | 6 | 17.27 | striving to sett a countenance on his new turnd face, that it might seeme of wainscot proofe, to behold her face without blushing. | OED: s.v. wainscot 6. attrib. and Comb. [Earliest citation from Marprelate pamphlets, 1588--"Wainscote faced bishops"] |
| wind-puffed | 6 | 47.08 | wind-puft wrath | OED: wind sb.$^{1}$ 30. Combinations C. [Cites Nashe's Pierce Penilesse and the Groatsworth.] |
| wine-washing | 2 | 38.04 | wine-washing poyson | OED: wine sb.$^{1}$ 8. Special combs. [Cites Groatsworth, then 1603.] |

Chettle not only uses relentless, as Greene does not, but he couples it with the same words as in the Groatsworth; with the passage quoted in the Table compare: "Aeliana with striving breathles, with weeping sightles, with crying voyceles, and sorrowe senseles, lay at the mercy of an inhuman savage, who shameles of sin, relentles at her intreats, and secure by reason of the place, was now ready to discover that hidden beauty, which had so long beene desired by his beast-like appetite" (P138 10).

It is Chettle, not Greene, who is prone to use such compounds as greene-springing, shallow-witted, sun-darkening, wind-puffed, and wine-washing: in fact, as will be shown below in the analysis of compound words, compounds of noun and present participle, like sun-darkening and wine-washing, are frequent in Chettle, but do not appear at all in the Greene corpus. Similarly, the compounds with Arch-, ill-, and long- are of the sorts conspicuous in Chettle's writings. Chettle's diction, as Sidney Thomas had noted, has an "old-fashioned cast":[1] and this penchant for somewhat antique words, which is not at all characteristic of Greene, seems to be reflected in the Groatsworth, side by side with Chettle's equally noticeable tendency to adopt new words and senses.

The evidence of uncommon words and usages most decidedly favors Chettle's authorship of the Groatsworth of Wit.

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[1] Review of English Studies, n.s., I (January, 1950), 10.

## B. Morphological Variables

### 1. Prefixes

Procedures. The feasibility of distinguishing writers' styles by the criterion of the relative frequency in their writings of words beginning with various prefixes and suffixes has already been studied with interesting results by the Australian scholar Alfred Hart.[1] The present investigator adopted Hart's lists in the expectation that, though not exhaustive, they might be extensive enough to produce at least a few prefixes and suffixes showing distinctively different patterns of usage by Greene and Chettle. The decision to adopt Hart's lists was motivated also by the desire to eliminate subjectivity in the choice of the prefixes to be studied.

From the Greene and Chettle aggregate verbal indexes, there were extracted and tabulated all occurrences of words beginning with the following prefixes: ad-, be-, con-, de-, dis-, en-, ex-, for-, in-, out-, over-, per-, pre-, pro-, re-, sub-, un-. On the assumption that, whatever the obscure reason for a writer's preference for words beginning with a certain prefix, it would have to do rather with form and sound than with etymology,[2] all occurrences of words having a prefix of the given form were included, even though in a few cases the particle stood for a different prefix in the source language (e.g., advance: VL abantiare, fr. L. abante before", fr. ab- + ante). On the same principle, assimilated forms of the listed prefixes (e.g., ac-, af-, etc., for ad-) were excluded, though not the variant em- for en-. Different senses of the same prefix (e.g., in- "not" and in- "in, into") were disregarded. Variant spellings of certain prefixes (e.g., des- and dis-) were of course taken into account and all occurrences were tabulated according to the modern norm.

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[1] Shakespeare and the Homilies (Melbourne, 1934), pp. 219-241. Hart tabulated the use of prefixes and suffixes in the plays of Shakespeare and Marlowe and in the disputed play of Edward III.

[2] This is probably even more true of word-endings, whether recognized suffixes or not. Greene, e.g., has a liking for words ending in -ump: dump, frump, jump, stump, thump, trump; he has 34 occurrences of these words, whereas Chettle has none.

When the process of extraction and tabulation had been completed, the resulting figures were converted into rates of frequency per thousand words for each prefix and the Differential Ratios were then calculated. Of the seventeen prefixes studied, Greene and Chettle showed the requisite Differential Ratio of 1.5 or higher in their use of seven. These seven prefixes, consequently, were retained as markers (Table 15).

Table 15
Discriminating Prefixes
Frequency per 1000 Words

| | ad- | be- | ex- | in- | pro- | re- | un- | Total |
|---|---|---|---|---|---|---|---|---|
| Greene | .74 | 3.03 | 2.73 | 3.59 | 1.80 | 5.82 | 1.05 | 18.76 |
| Chettle | 1.55 | 4.77 | 4.44 | 6.11 | 2.96 | 8.77 | 2.66 | 31.26 |

Chettle uses every one of these prefixes at a higher rate of frequency than Greene: and the average Differential Ratio is 1.67. The greatest D.R. is in the use of the prefix un-. Two and a half times as many cases of occurrences of words beginning with un- appear in Chettle as in Greene.[1] A comparison of the concordance entries reveals an interesting basic difference between the two writers in that Greene is conventional in his use of this negative prefix and Chettle quite enterprising. Except for his use of unwares for unawares, the only Greene usage which might conceivably be regarded as somewhat uncommon is unript, whereas Chettle has unadvantageable, unhaunted, unmatchable, unmisdeeming, unmundified, unreprovable, unreverent, untaken, and unwilful. Greene tends, where the option exists, to prefer the negative prefix in-, using inconstant, for example, 11 times, and the common Elizabethan alternative unconstant not at all, and using ingrateful 4 times, ungrateful only once.

Findings. When all occurrences in the Groatsworth of words beginning with the discriminating prefixes had been tabulated, and the frequency rates per thousand words calculated, the results were as shown in Table 16.

In all seven cases, the rates of frequency in the Groatsworth match those of Chettle, not Greene. For the group as a whole, the frequency rate in the Groatsworth is 29.27 per thousand words, as compared with 31.26 in Chettle and 18.76 in Greene. When the four prefixes of highest frequency, be-, ex-, in-, and re-, are taken as a group, the frequency rates are 15.17 for Greene, 24.09 for Chettle, and 22.18 for the Groatsworth. The writer of the Groatsworth shows the Chettle special liking for the prefix un-, and the tendency to use it somewhat uncommonly, as in unreproved, unsavorly, and unseamed.

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[1] For these tabulations the entire Greene and Chettle corpora (104,596 and 43,190 words respectively) were used, rather than the rounded 100,000 and 40,000 corpora used for the tabulation of lexical choice.

Table 16
Discriminating Prefixes
Frequency per 1000 Words

| | Greene | Chettle | Groatsworth |
|---|---|---|---|
| ad- | .74 | 1.55 | 1.64 |
| be- | 3.03 | 4.77 | 5.00 |
| ex- | 2.73 | 4.44 | 4.09 |
| in- | 3.59 | 6.11 | 5.00 |
| pro- | 1.80 | 2.96 | 3.27 |
| re- | 5.82 | 8.77 | 8.09 |
| un- | 1.05 | 2.66 | 2.18 |

## 2. Suffixes

Procedures. As with the prefixes, the investigator adopted Hart's list of nineteen suffixes, as follows: Adjectives: -able, -ant, -ary, -ate, -ent, -ful, -ible, -ish, -ive, -less, -ous, -y: Nouns: -ance, -ence, -er, -ment, -or, -tion; Adverb: -ly. Two other suffixal endings which had come to notice as possible discriminators were also studied, namely, the noun suffix -ness and the verbal ending -ing.

The process of extracting words ending in these suffixes was facilitated by the computer-produced frequency-order listing of the vocabularies of each corpus. A computer program for end-sorted listings might have been written, but it proved more practicable to scan the frequency-order columns and tabulate all occurrences of each of the suffixes in question. Each page of the listing was re-checked twice to insure an accurate tabulation. Care had to be taken, of course, to tabulate an ending only when it was a true suffix; to include all variant spellings of a suffix (e.g., -aunce for -ance, and -nes and -nesse for -ness): and to include endings in -er and -or only when used for nouns of agent, and -ly only when an adverbial ending. When a word ended in double or triple suffixal elements (e.g. capaciously), it was tabulated for the final element only.

When the absolute counts had been converted into frequencies per thousand words and the Greene-Chettle Differential Ratios had been calculated, eight of the twenty-one suffixes studied were found to qualify as discriminators, with Differential Ratios of 1.5 or better (Table 17).

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Table 17
Discriminating Suffixes
Frequency per 1000 Words

| | -able | -ate | -ible | -ish | -less | -ly | -ness | -or |
|---|---|---|---|---|---|---|---|---|
| Greene | 1.03 | .62 | .13 | .29 | .70 | 4.67 | 1.32 | .33 |
| Chettle | 2.27 | 1.25 | .28 | .16 | 1.57 | 8.91 | 2.43 | .69 |
| Differential Ratio | 2.20 | 2.01 | 2.15 | 1.81 | 2.24 | 1.91 | 1.84 | 2.09 |

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Chettle uses all but one (-ish) of these discriminators at a higher rate of frequency than Greene; and the average Differential Ratio is 1.93. Interestingly enough, the greatest difference is in the use of the negative suffix -less: and as with un- Chettle shows more individuality than Greene, using freely such less usual forms as blushless, issueless, oarless, respectless, and stayless, whereas Greene, in a much larger corpus, has only two forms, sackless and succorless, that were at all uncommon at the time. Chettle has 42 different words in -less in a total of 68 occurrences of the suffix, whereas Greene has only 29 in a total of 73 occurrences.

Because of its high frequency rate, the verbal ending -ing merits notice, though its Differential Ratio of 1.46 falls just below the stipulated reliability figure. Chettle, with a rate of 20.60 per thousand words, was clearly given to much greater use of verbals in -*ing* than Greene, who has a rate of 14.08.

*Findings*. When all occurrences in the *Groatsworth* of words ending with the discriminating suffixes had been tabulated and the frequency rates per thousand calculated, the results were as shown in Table 18.

Table 18
Discriminating Suffixes
Frequency per 1000 Words

| | Greene | Chettle | *Groatsworth* |
|---|---|---|---|
| -*able* | 1.03 | 2.27 | 1.91 |
| -*ate* | 0.62 | 1.25 | 0.55 |
| -*ible* | 0.13 | 0.28 | 0.36 |
| -*ish* | 0.29 | 0.16 | 0.18 |
| -*less* | 0.70 | 1.57 | 2.09 |
| -*ly* | 4.67 | 8.91 | 8.55 |
| -*ness* | 1.32 | 2.43 | 2.73 |
| -*er* | 0.33 | 0.69 | 0.73 |

For this group of discriminators as a whole, the frequency rate in the *Groatsworth* is 17.10, compared with 17.56 in the Chettle corpus and only 9.09 in the Greene corpus. For the verbal ending -*ing* also, the *Groatsworth* rate (18.55) is significantly closer to Chettle's (20.60) than to Greene's (14.08). A grouping of the four suffixes of highest frequency produces the comparative figures shown in Table 19. This group has a Differential Ratio of 1.97. Greene uses these suffixes on the average only half as often as Chettle, and the rate in the *Groatsworth* is virtually identical with Chettle's.

Table 19
Suffixes of Highest Frequency

| Suffix | Greene | Chettle | Groatsworth |
|---|---|---|---|
| -able | 1.03 | 2.27 | 1.91 |
| -less | 0.70 | 1.57 | 2.09 |
| -ly | 4.67 | 8.91 | 8.55 |
| -ness | 1.32 | 2.43 | 2.73 |
| Totals | 7.72 | 15.18 | 15.28 |

Most striking, of course, is the fact that for the suffix -less, which Chettle favors most distinctively vis-à-vis Greene, the Groatsworth rate is even higher than Chettle's average frequency and three times that of Greene. Greene and Chettle are sharply contrasted in the number of different words they use with this suffix; Greene has only 29 in 104,600 words, Chettle has 42 in 43,200 words, and the writer of the Groatsworth, again showing the Chettle pattern, has already used 15 in 11,000 words. Chettle's rate of use of the two negative affixes combined (4.23) is almost two and one-half times that of Greene (1.75), and the Groatsworth rate (4.27) is again virtually identical with Chettle's.

Finally, Chettle's marked partiality for prefixes and suffixes in comparison with Greene suggests the combination of the two sets of frequencies as an additional parameter of their differing patterns of usage. Such a grouping produces a Differential Ratio of 1.75; and the application of this marker to the Groatsworth gives the results shown in Table 20.

Table 20
Total of all frequencies of discriminating prefixes and suffixes

| Greene | Chettle | Groatsworth |
|---|---|---|
| 27.85 | 48.82 | 46.37 |

## 3. Reflexive Pronouns

*Procedures*. Greene and Chettle use the *-self* forms of the *personal pronouns*, whether as reflexives or *as intensives* in apposition with the pronoun (as in "she admitted it herself"), at distinctively different rates. Greene's frequency is 2.31 per thousand words, as compared with Chettle's 3.80 per thousand: the Differential Ratio between the two is therefore 1.65, high enough for this variable to be considered a reliable discriminator, especially considering its relatively high average frequency of over three occurrences per thousand words. Curiously enough, despite the contextual factor in the author's requirement of first, second, or third person pronouns, or of masculine or feminine forms, Chettle's rate is higher for each of the eight reflexive pronouns, except *thyself*: and when the forms are grouped by person, Chettle has the *greater* frequency for all three persons. The two writers show distinctive differences for the first and third person, but not for the second person, reflexives. The most marked difference, and a significant one, because relatively independent of context, is in the use of the neuter *itself*, where Chettle's frequency rate (.25 per 1000 words) is *eight times* that of Greene (.03).

*Findings*. Comparison of the *Groatsworth* rates for reflexives with *those of Greene* and Chettle (*Table 21) reveals* that, with 42 occurrences, the overall average rate per thousand words for the disputed work (3.82) is virtually identical with that of Chettle. For five of the eight forms the *Groatsworth* rates match Chettle's, two match Greene's, one matches *neither; and* the *Groatsworth* total frequency for all first person, and for all *third person* forms, in which the two writers differ significantly (see Table 22), are similarly closer to those of Chettle.

In the use of *itself*, where the great difference between Greene and Chettle is *clearly due* to idiosyncratic usage by the latter, the *Groatsworth* rate reflects Chettle's predilection to a striking *degree*: the .46 rate is even higher than Chettle's average and is fifteen times greater than Greene's.

Analytical study of all concordance entries for the reflexive pronouns reveals certain characteristic usages which further differentiate the two writers. Greene's most distinctive habit is his use of the reflexive as object of the preposition *with* after the verbs *meditate*, *consider*, *determine*, *debate*, *weigh*, and *muse*; e.g.: "Mirimida ... *began* thus to *meditate with herselfe*" (F217 24); and "when I *consider with myselfe* what experience Ulysses got",

Table 21
Frequencies of Reflexive Pronouns

| Reflexive | Greene | Chettle | Groatsworth |
|---|---|---|---|
| herself | .22 | .32 | .27 |
| himself | .84 | 1.11 | 1.18 |
| itself | .03 | .25 | .46 |
| myself | .33 | .86 | .82 |
| ourselves | .03 | .07 | .09 |
| themselves | .47 | .72 | .18 |
| thyself | .28 | .21 | .36 |
| yourself, -ves | .12 | .25 | .46 |
| Totals | 2.32 | 3.79 | 3.82 |

Table 22
Frequencies of Reflexive Pronouns

| Reflexives | Greene | Chettle | Groatsworth |
|---|---|---|---|
| First person (*myself*, *ourselves*) | .35 | .93 | .91 |
| Second person (*thyself*, *yourself*, *-yes*) | .40 | .46 | .82 |
| Third person (*herself*, *himself* *itself*, *themselves*) | 1.56 | 2.41 | 2.09 |

(M132 18). Greene has this construction 17 times; but Chettle does not have it at all, though the listed verbs occur in his corpus a total of 17 times. Chettle's most characteristic tendency is a preference for the reflexive as subject without the appositive pronoun, as in "myself have seen", rather than "I myself have seen". Though both writers use this construction, Chettle, unlike Greene, shows a decided preference for it over the more usual practice; and he uses it four times as often as Greene. Both writers also use the reflexive in a participial phrase, as in "themselves flocking about Thenot and Collin" (E083 05); but Chettle uses it in this way almost four times as often. Two somewhat odd usages found in Chettle, and not in Greene, are the pointed repetition of the reflexive, as in "remember *thyself* what of *thyselfe* thou promisedst" (P139 05); and the use of the phrase *of itself*, as in "that poore base life, *of itselfe* too badde, yet made more beggerly, by increase of nomber" (K021 02).

In all of the usages noted, except that the *Groatsworth* has no case of the participial construction, the practice of the writer of the *Groatsworth* corresponds to that of Chettle, not Greene. In six uses of the listed verbs, he has no case of the Greene type, as in "consider with myself". He has the reflexive as subject without the appositive pronoun even more often than Chettle's average frequency and at a rate eleven times that of Greene. And he has both the repetition of the reflexive and the *of itself* construction found only in Chettle: compare "leave *itselfe* to speak for *itselfe*" (G005 10); and "mans time is not *of itselfe* so short, but it is more shortned by sinne" (G047 10).

## 4. Gerund Plurals

*Procedures*. The use of the gerund in the plural is markedly characteristic of Chettle, but rare in Greene. A scanning of the aggregate Greene and Chettle concordances produced for each writer a list of words ending in *-ings*. After such non-gerund forms as *strings* had been deleted, the Greene list contained 14 occurrences of 12 different words, whereas the Chettle list, from a much smaller corpus, included 29 occurrences of 14 different words. Chettle has a predilection for verbal words with this ending, both those in which the original verbal sense was lost, such as *dealings*, *doings*, and *writings*, and those actually functioning as gerunds: he uses them five times as often as Greene. When verbal words of the first class were eliminated, however, a much greater distinction was disclosed: only two of the Greene words (*dissemblinges* and *imbracings*) functioned as gerunds, whereas Chettle's gerund plurals numbered at least fourteen: *borings*, *butcherings*, *clippings*, *corrosivings*, *deceivings*, *drawings* (in the sense of "pullings"), *mutterings*, *preservings*, *printings* (used with verbal force), *railings*, *standinges*, *threatenings*, *weepings*, *whisprings*: Chettle also has *gettings*, gleanings, proceedings, and takings, which have not been included, although as Chettle uses these words they appear to retain some verbal force.

Findings. Four gerund plurals occur in the Groatsworth, twice as many as in the entire Greene corpus; the Groatsworth rate of frequency for this unusual usage corresponds to Chettle's practice, not Greene's. Chettle's tendency to use the gerund plural form in series (e.g., K025 20) is also found in the Groatsworth: "Seest thou not dalie ... rackinges of the poore, raisinges of rents ....".

## 5. Compound Words

Procedures. Hart[1] has produced evidence that writers' habitual practices in the use of compound words may differ markedly enough to serve as a means of distinguishing their styles; and the results of the present investigation bear him out.

We were confronted, of course, with the problem of definition, since no wholly satisfactory criteria exist for identifying compounds. One linguistics scholar writes: "Speaking rather unscientifically, however, we can use the term compound word to describe certain phrases of common occurrence, whose distribution is similar to that of words."[2]; and another defines them loosely as "combinations of two or more words which are written as one word or hyphened", adding, however, that "the conventions of writing ignore a large number of compounds which though written as separate words express more than the sum of the parts."[3] In Elizabethan, as in modern texts, compounds may appear in closed form as one word, in hyphenated form, or in open form as two separate words. (For the purpose of this study, forms recognized as compounds were pre-edited for the computer and open forms were keypunched as one word or hyphenated according to present practice.) To minimize the element of subjective appraisal in identifying compounds, it was decided that all combinations of two or more words functioning lexically as single words would be tabulated, with the exceptions of compound prepositions (without, instead of, notwithstanding) and the so-called "separable verbs" (give over, take up); and that care would be taken to insure that wherever judgments had to be made, they would be applied consistently to all texts. It was felt, however, that the study should in any case focus on those specific types of compounds which lent themselves to precise description and classification. In addition, noun + noun compounds (as alehouse, ensign-bearer, conycatcher) were discarded as too largely context-bound. A firmly objective basis was thus assured by limiting the study to such compounds--chiefly those of adjective, adverb, or noun with the participle--as occur without much regard to context.

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[1] Alfred Hart (Shakespeare and the Homilies) has used rates of occurrences of compounds in his attribution studies.

[2] W. Nelson Francis, The Structure of American English, p. 206.

[3] Porter G. Perrin, Writer's Guide and Index to English, 3rd ed., p.476.

When first the verbal index volumes and then, as a further check, the concordances, had been scanned and all occurrences of the types of compounds to be analyzed had been tabulated, Chettle was found to be higher than Greene in all categories of participle compounds (Table 23).

Table 23
Participle Compounds

| | Adjective + Participle | Adverb + Participle | Noun + Participle |
|---|---|---|---|
| Greene | .14 | .16 | .09 |
| Chettle | .44 | .60 | .49 |

The Differential Ratios are 3.14 for adjective + participle, 3.75 for adverb + participle, and 5.44 for noun + participle. When all three categories are combined, Greene's total frequency is .39 per thousand words as compared with Chettle's frequency of 1.53, giving an overall Differential Ratio of 3.92.

When compounds with the present participle were separated out, the difference in usage between the two writers was even more pronounced. Greene has only four such compounds (.038 per 1000 words), whereas Chettle has 22 (.509 per 1000 words), a Differential Ratio of 13.4. (Such forms as *conycatching*, *housekeeping*, and *self-liking*, whether used as nouns or as attributive adjectives, were of course not included in this tabulation.) Greene's rate of frequency for compounds with the past participle is .36, Chettle's 1.11; and the D.R. here is 3.08.

The sharpest difference of all emerged for the combination of noun and present participle. This provided a highly significant stylistic marker since Greene has not a single case of this type of compound, whereas Chettle has eight cases, namely: *all-yielding*, *belly-pinching*, *light-giving*, *lust-burning*, *self-praising*, *shame-forgetting*, *soul-drowning*, and *world-cheering*.

One other type of compound, that of noun + *-like* (as in *courtesan-like*), and also combinations with *-thing* (*anything*, *everything*, *something*) and *-wise* (*anywise*, *likewise*, *otherwise*) occur with significantly greater frequency in Chettle and prove useful discriminators (Table 24).

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Table 24

| | *-like* | *-thing* | *-wise* |
|---|---|---|---|
| Greene | .06 | .12 | .03 |
| Chettle | .30 | .42 | .44 |
| D.R. | 5.00 | 3.50 | 14.67 |

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*Findings*. Chettle uses all these types of participial and other compounds with significantly greater frequency than Greene; and in every category the rates of occurrence in the *Groatsworth* correspond to those found in the Chettle corpus (see Table 25). The writer of the *Groatsworth* uses compounds of adjective, adverb, and noun with the participle from three to eight times as often respectively as Greene: where Greene's total frequency of participial compounds is about two in 5000 words, Chettle's is over somewhat over seven, and that of the *Groatsworth* is over ten. The writer of the *Groatsworth* uses compounds formed with the present participle nineteen times as often as Greene; Greene's rate is equivalent to one occurrence of this type of compound in 25,000 words, Chettle's to one in 2000 words, and the rate in the Groatsworth, with eight cases, is equivalent to one in 1500 words (Table 26). Most striking is the fact that the noun + present participle type of compound, which is most characteristic of Chettle and not found at all in Greene, turns up three times in the Groatsworth (home-breeding, sun-darkening and wine-washing). Similarly impressive evidence of the Chettle pattern in the Groatsworth appears for the combinations with -like, thing, and -wise (see Table 27). Finally, when the frequencies for the four categories in which Greene and Chettle show the highest Differential Ratios are grouped (Table 28), Greene has a total rate of .387, Chettle 1.966, and the Groatsworth 2.726 per thousand words.

When all the compound words in Greene, Chettle, and the Groatsworth were ordered alphabetically and compared, the Chettle corpus was found to contain six of those in the Groatsworth (aforehand, amber-colored, beforetime, court-like, longtime, and self-love), and the much larger Greene corpus only five (base-minded, beforetime, court-like, self-love,

Table 25
Participle Compounds

| | Adjective + Participle | Adverb + Participle | Noun + Participle | All Participial Compounds |
|---|---|---|---|---|
| Greene | .14 | .16 | .09 | .39 |
| Chettle | .44 | .60 | .39 | 1.43 |
| Groatsworth | .45 | 1.00 | .73 | 2.18 |

Table 26

| | Compounds with Present Participle | Compounds of Noun + Present Participle |
|---|---|---|
| Greene | .038 | .000 |
| Chettle | .509 | .185 |
| Groatsworth | .727 | .273 |

Table 27

| | Compounds with -*like* | Compounds with -*thing* | Compounds with -*wise* |
|---|---|---|---|
| Greene | .057 | .12 | .03 |
| Chettle | .301 | .42 | .44 |
| *Groatsworth* | .273 | .64 | .73 |

Table 28
Group of Compounds with Highest Differential Ratios

| | Greene | Chettle | *Groatsworth* |
|---|---|---|---|
| Adj. or Adv. + Part. | 0.30 | 1.04 | 1.45 |
| Noun + Pres. Part. | 0.00 | 0.185 | 0.273 |
| Noun + -*like* | 0.057 | 0.301 | 0.273 |
| Combins. with -*wise* | 0.03 | 0.44 | 0.73 |
| *Totals* | 0.387 | 1.966 | 2.726 |

and *shame-faced*). Whereas Greene is conventional, both in the corpus and elsewhere, in the use of compounds with *arch-*, Chettle has the unusual "*Arch-overseers* of the Ballad-singers", as the *Groatsworth* has *Arch-plaimaking-poet*. (Compare also "Book-binder hys Arch-workmaister" in Chettle's epistle to *Gerileon*.) Similarly, Chettle and the *Groatsworth* share an inclination toward relatively unusual compounds in *ill-* and *long-*. *Ill-gathered* in the *Groatsworth* can be compared with *ill-getting*, *ill-employed*, and *ill-rule* in Chettle: Greene has only the very common *ill-favored* and *ill-shapen*. *Long-laid-up* in the *Groatsworth* can be paralleled with *long-hid*, *long-received*, *long-desired*, and *long-tossed* in Chettle: Chettle has six compounds with *long-*, Greene none at all.

## C. Syntactical Variables

### 1. Parentheses

Procedures. Since, as casual inspection will show, Elizabethan authors vary widely in their propensity to use parenthetical phrases and clauses, this usage can be a stylistic discriminator between any two writers who exhibit consistently differing rates.

Not all parenthetic elements are enclosed within marks of parenthesis, and we must distinguish between an author's tendency to embody such expressions in his prose and his practice in the use of the typographical indicators. It is the latter usage, however, that provides the most concrete and easily quantifiable data, and we therefore limited this study to parentheses marked by "curves" or "parens." We must also distinguish between the discretionary, properly stylistic, use of parentheses to set off extraneous or interrupting material--as in additional, explanatory, illustrative, or corrective comment, exclamatory and other asides, and indications of the action accompanying the speaker's words in dialogue--and the merely conventional use of the marks by the Elizabethans to set off speech tags--"Yea (saith he) it is so"--and forms of address--"Truly (my good friends) we may not do it". The purely conventional uses are excluded from this comparative analysis.

Most important, of course, is the question whether the parentheses that appear on the printed page represent the author's own usage or whether they may not have been supplied at the printing house or, conversely, deleted there from the author's manuscript. Printer interference with the writer's copy would obviously make this an unreliable means of discrimination. Actually, however, considerable evidence exists that compositors were careful to reproduce an author's marks of parenthesis accurately and were not disposed to supply parens not indicated in their copy. Chambers (I,196) observes that parentheses were not on the same footing with punctuation marks, which were often treated casually by compositors, but rather that "printers were normally guided by their copy in this respect." Thorndike's study of the matter led him to the conclusion also that "The printers seem to follow copy closely in the case of parentheses". And in the parallel situation with regard to contractions, Hoy found "good reason for believing that they [compositors] reproduced such forms with considerable fidelity."[1] A point not hitherto noted is that Renaissance recognition of parenthesis as a figure of speech, classified under hyperbaton, "the genus of the syntactical figures that work by disorder",[1] probably lent special status to marks of parenthesis in the eyes of the compositor. Finally, the very fact of the remarkable consistency of the rates for an author (and this is notably true of Greene and Chettle) in texts printed by a number of different printing houses, and handled by an even larger number of different compositors, confirms this view.

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[1] Ashley H. Thorndike, "Parentheses in Shakespeare", Shakespeare Association Bulletin, IX (1934), 35; and Cyrus Hoy, "The Shares of Fletcher and his Collaborators in the Beaumont and Fletcher Canon", Studies in Bibliography, VIII (1956), 138.

The procedure followed in counting parentheses was simply visual scanning of the base editions used, with a second scanning as an accuracy check, and then verification against Xerox copies of the Elizabethan originals. Tabulation included a record of the initial word in each case of parentheses.

Findings. Chettle's mean frequency per thousand words in use of parentheses is more than four times that of Greene; and this distinctive difference appears particularly significant because the rates are consistent for the individual works of each writer and their ranges do not overlap: Chettle's lowest rate is measurably higher than Greene's highest rate.

The frequency of parentheses in the Groatsworth of Wit is more than five and one-half times Greene's characteristic rate, and almost four times the highest rate found in the individual Greene works (see Table 29). It corresponds closely, on the other hand, to Chettle's practice: even higher than Chettle's average rate, it matches almost exactly his rate of 4.69 in the contemporaneous Kind-Heart's Dream.

Table 29
Parentheses

| | Greene | Chettle | Groatsworth |
|---|---|---|---|
| Total occurrences | 94 | 155 | 52 |
| Rate per 1000 words | .86 | 3.69 | 4.81 |
| Range over works | .55--1.34 | 1.78--4.69 | ------ |

Comparison of the words used by Greene, Chettle, and the writer of the Groatsworth to introduce parenthetical phrases reveals that as and for are in all cases the most frequent; but the disparity in their rates of occurrence parallels that found in the parenthetical usage itself. Greene uses each at the rate of .11 per thousand words; whereas Chettle's rates for as and for are .62 and .40 respectively and the Groatsworth rates are 1.18 and .90. Of 22 different words used in the initial position within parentheses in the Groatsworth[1], Greene so uses 12; Chettle, in the much smaller corpus of his writings, so uses 14. Initial words appearing in the Groatsworth and in Chettle, but not in Greene, are after, having, notwithstanding, the, were: none of these appears in the Greene control text, Farewell to Folly, either, whereas two--after and were--appear again in the Chettle epistles. Initial words appearing in the Groatsworth and in Greene, but not in the Chettle corpus, are that, to, and which; to and which, however, turn up in the Chettle epistles.

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[1] Cf. Sister Miriam Joseph, Shakespeare's Use of the Arts of Language, p. 294.

## 2. Word-Order Inversion

Inversion of the customary order of sentence elements was recognized by Elizabethan rhetoricians as a species of the figure of speech known as hyperbaton, "the figure of disorder". As such, it was consciously cultivated as a means of stylistic variation; and those writers who had a penchant for word-order inversion were known for their "disorderly" styles. Contemporary critical comments suggest that authors were likely to be thought of as conspicuously prone, or not prone, to this stylistic practice.

The stimulus to compare the Greene and Chettle practices in word-order inversion was the empirical observation that Chettle seemed generally more inclined to invert the usual sequence of words, phrases, and clauses than Greene, and that, specifically, Chettle had a tendency not shared by Greene to invert the usual order of prepositional phrases and past participles. Was Chettle in fact more likely than Greene to write "pamphlets by the state forbidden", rather than "pamphlets forbidden by the state"? It was thought that distinctively different habits on the part of Greene and Chettle in the use of inversion, if they were found to exist, and if such practices could be objectively described and classified, might prove quantifiable criteria for discriminating their styles.

Procedures. Since an exhaustive study of every possible sort of word-order inversion was obviously beyond the scope of the project, it was decided at first to analyze all types involving prepositional phrases. Even this, however, proved too large an order, and the study was arbitrarily further limited to phrases governed by the prepositions of and by, for which alone it was necessary to scrutinize 4850 entries of the two prepositions in the Greene, Chettle, and Groatsworth concordances. The study was also of course confined to the prose of both authors.

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[1] Namely: after, and , as, assuring, being, for, having, I, if, laying, notwithstanding, O, like, that, the, though, to, urged, which, while, with, were.

It was necessary first to establish a definition of "inversion". For this purpose every prepositional phrase was considered a modifier, either adjectival or adverbial, of some major sentence element. The "normal" sequence of the modified element and modifier was then defined, and any other sequence was labeled an inversion. Thus "normal" word order prescribes that a prepositional phrase which modifies a noun or an adjective should be placed after that noun (N + P), as in "a lawyer by trade", or adjective (A + P), as in "worthy of praise". Every reversal of these sequences, every (P + N)--"by trade a lawyer"--or (P + A)--"of visage amiable"--was to be regarded as an inversion. Similarly, normal word order provides that a phrase modifying a predicate verb, or the sentence as a whole, be placed in the predicate after the subject (1), the verb (2), and the verb complement (3), if there is a complement: for example: "They forbid the pamphlets by governmental authority" (1 + 2 + 3 + P). Accordingly, those adverbial phrases which occurred in the predicate after the verb, and after its substantive, adjective, clause, or nonexistent complement, were considered "normal"; those which stood earlier in the sentence or clause were recorded as inversions, and, as will be detailed below, they were then classified further according to their position in the sentence.

Obviously, by the inflexible definitions adopted, some "inverted" sequences are not at all cases of abnormal word order. For the purposes of this attribution study, however, the fixed standards will enable us to measure the varying practices of the two writers relative to each other.

All prepositional phrases introduced by of and by having been abstracted from the aggregate Greene and Chettle concordances, they were classified according to the criteria of (1) element modified, and (2) position in the sentence. For phrases modifying a noun or adjective, the choice of either of two possible positions established a simple normal-inverted dichotomy--normal = "amiable of face" (A + P), "inverted" = "of face amiable" (P + A); normal = "a lawyer by trade" (N + P), inverted = "by trade a lawyer" (P + N). (See Table 30 for the complete classification adopted.) A prepositional phrase modifying a verb or clause, however, is syntactically free to assume any of four possible positions in a three-part English sentence (Subject + Verb + Complement = 1 + 2 + 3). It may stand at the beginning of the clause--"By this device he achieved his purpose" (P + 1 + 2 + 3); between the subject and verb--"He by this device achieved his purpose" (1 + P + 2 + 3); between the verb and its complement--

"He achieved by this device his purpose" (1 + 2 + P + 3);[1] or it may stand in the predicate, after the subject-verb-complement--"He achieved his purpose by this device" (1 + 2 + 3 + P). The last was considered normal; the others were considered three categories of inversion. Prepositional phrases modifying verbals--participles and infinitives--were classified separately. Both these elements are abridged insert clauses which function in the matrix as nouns or adjectives, but, like the verb forms they are, also take objects and modifiers, including prepositional modifiers. We thus had a four-fold general classification of inverted phrases: Noun Modifiers, Adjective Modifiers, Verbal Modifiers, and Predicate Modifiers. The fourth class, Predicate Modifiers, was found to be by far the largest, containing three-fourths (302 out of 393) of all the cases of prepositional phrase inversion. It includes the sub-classes of verb modifiers and sentence modifiers. The verb modifiers, as already indicated, were classified according to which of the three "inverted" positions the phrase assumed with respect to subject, verb, and complement. In the second of these possible placements, in which the phrase is placed after the subject but before the verb (1 + P + 2 + 3), further distinctions were made according to whether the verb was simple--"The sheik in desperation struck the camel" (1 + P + V + 3)--or accompanied by one or more auxiliaries, which provide further choices for the placement of the prepositional phrase, namely, before the verb phrase--preplacement--as in "The sheik in desperation would strike the camel" (1 + P + v + V + 3), or within the verb phrase--implacement--as in "The sheik would in desperation strike the camel" (1 + v + P + V + 3).

In both the preplacement and implacement categories, further distinctions were made, this time on the basis of the nature of the modified verb. The distinction seemed advisable because of tentatively identified differences between the styles of the two authors. Chettle, for example, seems to have been more willing to implace a prepositional phrase when the construction was a passive one, in which case the phrase stands after the finite form of *be* and before the past participial verb, as in "The sheik *was* in retaliation struck by the camel", or even more typically, "The sheik *was* by the camel abandoned", both of which are represented by (1 + be + P + Vpart + 3). In the classification, therefore, the preplacement category (1 + P + v + V + 3) is divided into three as shown; and the implacement category (1 + v + P + V + 3) is similarly subdivided.

In addition to the three placement categories, two other varieties of prepositional construction are included under "Verb Modifiers". The first, (*of* + rel) or (*by* + rel), includes all the phrases in which the object of the preposition is a relative pronoun ("of which

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[1] When the object of the verb is a clause, no possibility of the sequence 1 + 2 + 3 + P exists; such cases were therefore included with the fourth sequence as normal.

## Table 30

### CLASSIFICATION
### OF PREPOSITIONAL PHRASE INVERSIONS

- I. NOUN MODIFIERS
  - A. Partitive
  - B. Non-partitive
- II. ADJECTIVE MODIFIERS
- III. VERBAL MODIFIERS
  - A. Participle
    - 1. Past Participle
    - 2. Present + Past Participle
    - 3. Present Participle
  - B. Infinitive + Participle
  - C. Infinitive
- IV. PREDICATE MODIFIERS
  - A. Verb Modifiers
    - 1. P + 1 + 2 + 3
    - 2. 1 + P + 2 + 3
      - a. 1 + P + V + 3
      - b. 1 + P + v + V + 3
        - (1) 1 + P + be + Vpart + 3
        - (2) 1 + P + v + Vpart + 3
        - (3) 1 + P + v + Vinf + 3
      - c. 1 + v + P + V + 3
        - (1) 1 + be + P + Vpart
        - (2) 1 + v + P + Vpart
        - (3) 1 + v + P + Vinf
    - 3. 1 + 2 + P + 3
    - 4. P + Rel
    - 5. Split Phrases
  - B. Reflexive Phrases
  - C. Adverb-equivalent Phrases

perfidious guilt she never was tainted"). The second category includes all cases in which the prepositional phrase is "split" ("What profession then are you of?").

The second sub-class under Predicate Modifiers, the "Sentence Modifiers", comprises two groupings; namely, reflexive phrases ("of himself") and those set phrases which are the equivalents of single adverbs (especially "of late" and "of force" meaning "necessarily").

The classification described provided the basis for sorting the inverted phrases of Chettle, Greene, and the Groatsworth of Wit into comparable categories (see Appendix E). Each occurrence had been coded, and, as the cases of inversion were listed and tallied in their appropriate categories, a separate tally was kept of the cases classified as normal or non-inverted, according to the pre-established definitions.

Quantification and Differentiation. Once all occurrences of inverted prepositional phrases had been tabulated, the data, overall and for each classification, were quantified as rates of occurrence per 1000 words, and the Differential Ratios of the two writers were calculated.

As the individual categories were evaluated, some, as expected, proved better discriminators between the two writers than others; and some failed altogether to discriminate. To rate the categories for their potential reliability as discriminators, two criteria were applied: (1) a frequency of at least one occurrence per thousand words in either writer, and (2) a Differential Ratio between the Greene and Chettle frequencies of at least 1.5.

When these criteria are applied to rank the of and by categories, the resulting order is not the same for the two prepositions. The composite of + by list attenuates some of the distinctions in the individual lists and strengthens others; but on the whole the combined list provides markers that are better discriminators than either list by itself, chiefly because the frequencies are higher. Five categories have frequencies above one occurrence per thousand words and differential ratios above 1.5; consequently, they qualify as discriminators of potentially the highest reliability (see Table 31). Three of the of + by categories have frequencies between .5 and 1.0 per thousand words and Differential Ratios above 1.5, thus qualifying as discriminators (Table 32). Four more of + by categories, with frequencies between .3 and .5 and D.R.'s above 1.5, should also be reliable discriminators (Table 33).

Table 31
Prepositional Phrase Inversions
Rank Class 1
Occurrences per 1000 words

| Category | Greene | Chettle | Differential Ratio |
|---|---|---|---|
| Total Inversions | 1.338 | 4.745 | 3.546 |
| Predicate Modifiers (all) | 1.099 | 3.356 | 3.053 |
| Verb Modifiers (all) | 0.975 | 3.194 | 3.276 |
| Verb Modifiers: P + 1 + 2 + 3 | 0.373 | 1.180 | 3.164 |
| Verb Modifiers: 1 + P + 2 + 3 | 0.306 | 1.088 | 3.556 |

Table 32
Prepositional Phrase Inversions
Rank Class 2
Occurrences per 1000 words

| Category | Greene | Chettle | Differential Ratio |
|---|---|---|---|
| Verbal Modifiers (all) | .076 | .972 | 12.789 |
| Participle | .010 | .648 | 64.800 |
| Verb Modifiers: 1 + v + P + V + 3 | .143 | .579 | 4.049 |

Table 33
Prepositional Phrase Inversions
Rank Class 3
Occurrences per 1000 words

| Category | Greene | Chettle | Differential Ratio |
|---|---|---|---|
| Past Participle | .000 | .370 | Inf. |
| Verb Modifiers: 1 + P + v + V + 3 | .076 | .301 | 3.961 |
| Verb Modifiers: 1 + be + P + Vpart + 3 | .038 | .486 | 12.789 |
| P + Rel | .086 | .463 | 5.384 |

For each of these top twelve discriminators, the Chettle inversion rate is higher and Greene's practice is nearer the so-called normal word order. Two general classes and their subdivisions, the Verb Modifiers and the Verbal Modifiers, differentiate the styles of Chettle and Greene. It can be determined precisely which constructions mark Chettle's style more than Greene's. About three times as often as Greene, on the average, Chettle orders sentences to the pattern P + 1 + 2 + 3, as in the following: "by a jurie he was found guilty and adjudged to die" (E096 29). Chettle also rates high in the second placement position, 1 + P + 2 + 3, in which the prepositional phrase is placed between the subject and the verb. Moreover, three subdivisions rank among the top discriminators so that we have a more precise picture of the stylistic differences in this placement position than in the first. All three subdivisions are inversions with verb phrases, rather than simple predicate verbs. That is, an inversion such as "I was by visible apparitions disturbed" (K011 14) is more typical of Chettle than one with a simple verb, such as "She ... by expresse statutes appointed all" (E101 32). More precisely, Chettle is typified more strongly by prepositional phrases implaced in the verb phrase than by those placed before the verb phrase; the implacement category (1 + v + P + V + 3) is higher both in frequency and in Differential Ratio than the preplacement category (1 + P + v + V + 3), and a subdivision of the implacement category also appears in the list (1 + be + P + Vpart + 3). Such constructions as the following are thus typical of common Chettle placements: "for never shall Prince of Thrace of his birthright be dispossest" (P127 13); "(If it is true that is of him reported)" (K019 07); "my master was by his Baylie and the broker persuaded" (P141 32). The constructions with a form of be and the past participial verb are particularly rare in Greene. In over 100,000 words of Greene text, only eight appear, four implaced and four preplaced; and these eight inversions constitute only 8.3% of his of and by phrases modifying a be + Vpart verb phrase, whereas Chettle inverts 44.3% of his be + Vpart modifiers.

The third major category under "Verb Modifiers" which ranks as a discriminator is the category P + Rel, in which the object of the preposition is a relative pronoun (or adjective); e.g., "by which meanes". The *of* + Rel constructions are rarer in Greene than the *by* + Rel. He uses only three in the corpus (a rate of .029); Chettle uses fifteen in a corpus only two-fifths as large (a rate of .347).

Chettle's style is differentiated from Greene's not only by inverted Verb Modifiers, but also by the class of Verbal Modifiers and two of its subdivisions. In this category, which includes both Participle Modifiers and Infinitive Modifiers, Chettle's rate is nearly 13 times greater than Greene's; and he inverts 37.8% of his verbal modifiers, Greene only 4.6% of his. Such constructions in these verbal categories as the following, reminiscent of Chettle's inversions with finite verbs, are typical: P + Inf-- "of him to speak more I have no pleasure" (P132 26); P + Inf + Part--"the poore woman found by the same fellowe *to be wronged*" (E093 15); Inf + P + Part--"assist me *to be* of this doubt *resolved*" (P124 03); Present Participle--"by chance lighting on Antony Nowenowe, I found" (K014 26); Present + Past Participle--"shee *having* by example of things past nothing *doubted* of things to come" (E091 15); "which time *having been* by the magistrates wisely *observed*" (K043 07); Past Participle--"injuries by them everywhere *offered*" (K020 17). Especially impressive are the subdivisions of Verbal Modifiers which appear in the discriminator list, Participle Modifiers and Past Participle Modifiers. Greene uses 52 past participles with *of* and *by* phrases, but, as noted earlier, he inverts only one of them, and it is not a typical part-participial inversion, but one here classified under Sentence Modifiers with the simple adverbial phrases. Chettle, in contrast, inverts almost one-third of his past-participial modifiers, 16 out of 49.

Each of the twelve top-ranking discriminators measures a practice which Chettle favors more than Greene. The few categories in which Greene is higher failed to qualify as discriminators by reason of low frequency, low Differential Ratio, or both.

The original categories are not, of course, the only sources of discriminators. The data might be handled in various other ways if a complete stylistic description of the authors' word-order patterns for prepositional phrases were desired. One interesting possibility is the comparison of preferences for one type of inversion over another. Such comparisons can be made by simply combining the original categories. If we assume, for instance, that an author might prefer to place prepositional phrases before certain verb sequences more than before others, then we may make a ratio of any alternative verb sequences and compare their preferences. Or we might take the ratio of any significant inverted sequence to the corresponding normal sequence. Between Chettle and Greene, such differences of choice are apparent in the use of prepositional modifiers of verb phrases, especially *be* + Vpart. The counts of their verb phrase modifiers may be combined in the following ratios: A ratio of inverted *be* + Vpart phrases to all other inverted verb phrases, with the implacement and preplacement categories combined in both cases (see Table 34), shows

Table 34

| Ratio | Greene | Chettle | Differential Ratio |
|---|---|---|---|
| $\frac{P, be + Vpart}{P, v + V}$ | $\frac{8}{15} = .53$ | $\frac{31}{7} = 4.43$ | 9.175 |
| $\frac{P, be + Vpart}{be + Vpart, P}$ | $\frac{8}{88} = .09$ | $\frac{31}{39} = .79$ | 8.67 |

that Chettle inverts more *be* + Vpart phrases than all others combined, more than four times as many *be* + Vpart phrases, in fact. The opposite preference is apparent in Greene; he inverts twice as many of the phrases which are not *be* + Vpart sequences. And a ratio of inverted *be* + Vpart phrases to normal *be* + Vpart phrases shows that Chettle inverts 44.29 of his *be* + Vpart phrases, 31 out of 70 cases, whereas Greene most decidedly prefers the normal order, inverting less than 10% (8 out of 96 cases) of his *be* + Vpart phrases. A clear tendency to invert prepositional phrases with a *be* + Vpart sequence is thus reaffirmed as one characteristic of the Chettle style, and, although the second ratio fails to meet the frequency requirement of .3 occurrences per thousand words, the first is a discriminator of respectable reliability.

The list of discriminators could be extended: but since the purpose here is attribution of authorship rather than stylistic description, the battery of 13 qualified markers already produced should prove more than adequate.

One question concerning differentiation remains to be answered: Do these discriminators reveal a genuine difference in tendency to invert word order, or merely a difference in tendency to use *of* and *by* phrases? It is a simple matter to determine whether the Greene and Chettle rates for the words *of* and *by* are significantly different. The Greene and Chettle frequency rates per thousand words for the total count of *of* and *by* phrases are respectively 33.47 and 28.52 (Table 35). Thus it is evident when this low Differential Ratio of

Table 35

| Preposition | Greene per 1000 | Chettle per 1000 | Differential Ratio | |
|---|---|---|---|---|
| | | | Total P | Inverted P |
| *Of* | 23.80 | 27.29 | 1.15 | --- |
| *By* | 4.71 | 6.18 | 1.31 | --- |
| *Of* + *By* | 28.52 | 33.47 | 1.17 | 3.55 |

1.17 for total phrases is compared with the 3.55 ratio for inverted phrases, that by far the largest factor measured is indeed word-order inversion, not word choice.

Findings. Greene and Chettle having thus been found to exhibit distinctively different habits of word-order inversion in their known prose--at least in the placing of prepositional phrases--the contrasting practices of the two writers (as they had been defined, classified, and quantified) were systematically compared (see Appendix F) with those found in the Groatsworth of Wit.

After all occurrences in the Groatsworth of phrases introduced by the prepositions by and of had been extracted, classified, and tabulated, each of the twelve categories of inversion which had qualified as discriminators of the Greene and Chettle patterns was considered in turn. These are the categories showing frequencies high enough to be reliable and dissimilar enough in the two authors to make it impossible for the Groatsworth to measure significantly close to one without being differentiated from the other.

The first discriminator (from Table 31) is the class of Predicate Modifiers as a whole. Chettle measures significantly higher than Greene in both this class and in the sub-category Verb Modifiers, of which it very largely consists; and the Groatsworth in both cases is even higher than Chettle in the incidence of inversion (Table 36).

Table 36
Inversions per 1000 words

| Discriminator | Greene | Chettle | Groatsworth |
|---|---|---|---|
| Predicate Modifiers | 1.099 | 3.356 | 3.818 |
| Verb Modifiers | .975 | 3.194 | 3.455 |

In each of the subdivisions of the classification Verb Modifiers, the Groatsworth also measures closer to Chettle. Both Chettle and the author of the Groatsworth open three times as many sentences or clauses with of or by phrases as does Greene (Table 37). In the second placement position (1 + P + 2 + 3), the affinities are equally clear. Greene does not favor this position, particularly when the predicate

Table 37
Inversions per 1000 words

| Discriminator | Greene | Chettle | Groatsworth |
|---|---|---|---|
| P + 1 + 2 + 3 | .373 | 1.180 | 1.182 |

verb is a phrase. Chettle and the writer of the Groatsworth by contrast both favor it strongly (Table 38).

Table 38
Inversions per 1000 Words

| Category | Greene | Chettle | Groatsworth |
|---|---|---|---|
| 1 + P + 2 + 3 | .306 | 1.088 | 1.273 |
| 1 + P + v + V + 3 | .076 | .301 | .273 |
| 1 + v + P + V + 3 | .143 | .579 | .909 |
| 1 + be + P + Vpart + 3 | .038 | .486 | .727 |

Chettle implaces prepositional phrases with the verb phrase be + Vpart; for example, "Hee was by her mild sufferance admitted to depart the Realme" (E091 19). Such constructions--"was by Phisitions given over" (G009 19), "was by the shepherds dogs werried" (G024 03)--appear eight times in the Groatsworth; twice the number Greene uses in all 104,600 words of the corpus. Greene has 96 of and by phrases with the be + Vpart sequence, but he inverts only 8, or 8.3% of them: Chettle has 70, and inverts 31, or 44%, and the Groatsworth writer inverts 67%.

Likewise in the category P + Rel, the rates in Chettle and the Groatsworth are similar and markedly higher than the Greene rate (Table 39). The difference is even more striking in the of + Rel category than the by + Rel, the Groatsworth having as many of's with relative pronoun objects as appear in the entire Greene corpus. The author of the Groatsworth has a pattern of frequency in inverting prepositional phrases of the predicate-modifier type which closely approximates Chettle's and differs greatly from Greene's.

Table 39
Inversions per 1000 Words

| Category | Greene | Chettle | Groatsworth |
|---|---|---|---|
| P + Rel | .086 | .463 | .445 |

The other broad class of inverted prepositional phrases to differentiate Greene and Chettle was the Verbal Modifiers. In the first subdivision of this class, that of phrases inverted with the participle, the Differential Ratio is still more pronounced. And for inversion of *by* and *of* phrases with the past participle it is greatest of all. The *Groatsworth* rates of frequency per thousand words (see Table 40) are lower than Chettle's, but they clearly belong to the order of magnitude characteristic of his style, rather than Greene's.

Table 40
Inversions per 1000 Words

| Category | Greene | Chettle | *Groatsworth* |
|---|---|---|---|
| Verbal Modifiers | .076 | .972 | .455 |
| Participle | .010 | .648 | .273 |
| Past Participle | .000 | .370 | .273 |

Most striking here, of course, are the data for the inversion of prepositional phrase and past participle, as in "by love possessed" or "by his counsell disinherited" (P167 08). This type of inversion never occurs at all in over a hundred thousand words of Greene's prose; yet it occurs, as might be expected of Chettle, three times in the eleven thousand words of the *Groatsworth of Wit*: "a man by nature furnished with all exquisite gifts" (G015 16); "you have wealth to maintain her, of women not little longed for" (G015 19); and "Looke but to me, by him perswaded to that libertie" (G044 19). The empirical observation of the rarity of this construction in Greene and its relative frequency in Chettle, which prompted the study of inversion in the two writers, is objectively confirmed. It is a significant stylistic discriminator. And it can be concluded that in the inversion of verbal modifiers, as in the inversion of predicate modifiers, it is the patterns of frequency characteristic of Chettle, not Greene, that are found in the *Groatsworth of Wit*.

The preponderance of the evidence for attribution lies in these twelve marker categories, but one other discriminator remains to be applied to the *Groatsworth*. One of the ratios of preference differentiated Chettle from Greene; a simple comparison will show that it also differentiates the *Groatsworth* from Greene. The ratio in question is that of inverted *be* + Vpart phrases to all other inverted verb modifier phrases, with the implacement and preplacement categories combined in both cases. Chettle's especially strong inclination to invert prepositional phrases with the verb sequence *be* + Vpart, shown in his inverting over four times as many of them as of all others, is clearly reflected in the *Groatsworth*. Greene, on the other hand, when he does invert, is decidedly more inclined to inversion of phrases other than those with the *be* + Vpart sequence (Table 41).

Table 41

|  | Greene | Chettle | *Groatsworth* |
|---|---|---|---|
| $\frac{\text{P, be + Vpart}}{\text{P, v + V}}$ | $\frac{8}{15} = .53$ | $\frac{31}{7} = 4.43$ | $\frac{10}{3} = 3.33$ |

The *Groatsworth* has been tested by the qualified discriminators and found matching Chettle in every case. The final discriminator, consequently--the total counts--which show Chettle using more than three and one-half times as often as Greene all the categories of prepositional phrase inversion in which the practices of the two writers can be significantly distinguished, asserts the kinship with the *Groatsworth* most impressively (see Table 42).

Table 42
Inversions per 1000 Words

|  | Greene | Chettle | *Groatsworth* |
|---|---|---|---|
| Totals of All Discriminant Categories | 1.338 | 4.745 | 4.384 |

If Chettle is the author of the *Groatsworth of Wit*, a final grouping of related categories which he favored should test particularly low in Greene and high in Chettle and the disputed work. Any bias in the classification can be avoided by taking the counts directly from the coded lists of inversions (Appendix E). Such a procedure also permits the inclusion of sequences of P + A, which are not all to be found in one category in the classification, as well as all sequences of P + Part, including those classified in combination with the present participle. The following constructions, then, emerge as the Chettle favorites: (1) P + Part--"Strict lawes by Celinus abrogated" (P139 34); (2) be + P + Vpart--"Ballads that are by authority forbidden" (K060 08); (3) be + P + A, or P + A--"Celinus was not then of my master altogether unmindful" (P142 04); (4) P + *be* + Vpart--"many abroad by corruption were winkt at" (E102 21). The absolute counts are 12 for Greene, 62 for Chettle, and 17 for the *Groatsworth*; and the frequencies per 1000 words are as shown in Table 43.

Chettle's prose style can be sharply distinguished from Greene's in that he uses each of these types of inversion at a most significantly higher rate of frequency than Greene and uses all of them taken as a group fourteen and one-half times as often. The frequency rates in the *Groatsworth* are in all cases, and *in toto*, comparable to Chettle's; and for the group the rate of occurrence of these inversions in the *Groatsworth* is seventeen times the rate characteristic of Greene.

Table 43
Inversions per 1000 Words

| Category | Greene | Chettle | Groatsworth |
|---|---|---|---|
| P + Part | .010 | .463 | .364 |
| be + P + Vpart | .038 | .486 | .727 |
| P + A | .010 | .208 | .364 |
| P + be + Vpart | .038 | .231 | .182 |
| Totals | .096 | 1.388 | 1.636 |

Four categories of prepositional phrase inversion which occur altogether 36 times in Chettle do not appear at all in the Greene corpus. These are (1) inversion with the past participle--"that gravitie of enditing by the elder exercised" (K005 08); (2) with infinitive plus participle--"the poore woman found by the same fellowe to be wrongd" (E093 15);(3) with adjectives--"Celinus was then of my master altogether unmindful" (P142 04); and (4) with present plus past participle--"whence (by my hostisse care) being removed" (K011 09). All but the last of these categories of inversion turn up in the Groatsworth of Wit, as follows: (1)--"You have wealth to maintaine her,' of women not little longed for (G015 19), "a man by nature furnished with all exquisite proportion" (G015 16), and "me, by him perswaded to that libertie" (G044 19); (2)--"vext to be by a peasant so abusde" (G027 11); (3)--"sith either of you are of other so fond" (G022 20). In all there are thus five occurrences in the Groatsworth of these constructions, none of which Greene ever uses in the 100,000-word corpus of his prose.

The inescapable conclusion is that the Groatsworth of Wit has patterns of prepositional phrase inversion which characterize the style of Henry Chettle.

# IV

## TABULAR RESUMÉ: THE AUTHORSHIP OF GREENE'S GROATSWORTH OF WIT

(All data are given as average occurrences per 1000 words)

### 1. Favored Words: 50 Discriminators

| | Greene | Chettle | Groatsworth |
|---|---|---|---|
| 29 Greene plus-words | 8.44 | 0.98 | 2.00 |
| 21 Chettle plus-words | 2.22 | 9.43 | 9.27 |
| 25 Greene words with 10+ D.R.* | 5.53 | 0.05 | 1.18 |
| 10 Chettle words with 10+ D.R. | 0.17 | 3.28 | 3.09 |
| 6 Chettle words with 25+ D.R. | 0.05 | 1.85 | 2.00 |
| All -ever forms (however, whatever whoever, etc.) | 0.00 | 0.51 | 0.91 |
| Percentage of ye in all uses of second person pronoun | .5 | 38.3 | 18.7 |

*D.R. = Differential Ratio between Greene and Chettle frequency rates.

### 2. High-Frequency Words: 17 Discriminators

| | Frequency in Greene | Frequency in Chettle | Frequency in Groatsworth |
|---|---|---|---|
| 11 Greene plus-words | 95.73 | 68.36 | 64.45 |
| 6 Chettle plus-words | 15.07 | 21.73 | 21.08 |

| | | | |
|---|---|---|---|
| 5 discriminators of highest frequency | | | |
| *a* | 21.90 | 15.88 | 16.73 |
| *and* | 36.62 | 28.82 | 25.09 |
| *as* | 12.52 | 8.59 | 8.27 |
| *by* | 5.31 | 6.69 | 7.18 |
| *so* | 7.89 | 5.53 | 7.18 |
| Totals of 5 discriminators | 84.24 | 65.51 | 64.45 |

| | |
|---|---|
| *Frequency distribution patterns:* (in randomly-selected 2000-word blocks) | 14 agree more closely with the Chettle patterns, 2 with the Greene patterns, 1 with neither. All 5 discriminators of highest frequency have patterns resembling Chettle's. |

### 3. *Uncommon Words*

Of 33 relatively uncommon words or senses--those which emerged from a total vocabulary screening as the least common used by the writer of the *Groatsworth of Wit*--none occurs in the Greene corpus, nor in the Greene control text, even though four of these words occur more than once in the *Groatsworth*. Five of the 33 occur in the smaller Chettle corpus, including all four used repeatedly in the *Groatsworth*; and one more occurs in the Chettle control text. Similar usage, and similar verbal collocations in the use of these words, give further evidence of Chettle's style.

### 4. *Prefixes: 7 Discriminators*

| | Greene | Chettle | Groatsworth |
|---|---|---|---|
| Total of all 7 discriminators | 18.76 | 31.26 | 29.27 |
| Total of 4 having highest frequency | 15.17 | 24.09 | 22.18 |
| Prefix *un-* | 1.05 | 2.66 | 2.18 |

All 7 discriminant prefixes (average D.R. = 1.67) have rates of occurrence in the *Groatsworth* that differ widely from Greene's characteristic rates and agree closely with Chettle's. The *Groatsworth* shows Chettle's special liking for the negative prefix *un-* and his propensity for unusual *un-* words, in contrast to Greene's conventional use of this prefix.

### 5. Suffixes: 8 Discriminators

| | Greene | Chettle | Groatsworth |
|---|---|---|---|
| Total of all 8 discriminators | 9.09 | 17.56 | 17.10 |
| Total of 4 having highest frequency | 7.72 | 15.18 | 15.28 |
| Suffix -less | 0.70 | 1.57 | 2.09 |
| Verbals in -ing | 14.08 | 20.60 | 18.55 |

All but one of the discriminant suffixes (average D.R. = 1.97) have frequency rates differing greatly from Greene's and agreeing closely with Chettle's. The Groatsworth reflects Chettle's predilection for the negative suffix -less, his inclination toward uncommon -less words, his tendency to use such forms as respectless, instead of a prepositional phrase, and his habit of using words with this suffix in series.

### 5a. Prefixes and Suffixes

| | Greene | Chettle | Groatsworth |
|---|---|---|---|
| Totals: 15 discriminant prefixes and suffixes | 27.85 | 48.82 | 46.37 |
| un- + -less | 1.75 | 4.23 | 4.27 |

### 6. Reflexive Pronouns

| | | | |
|---|---|---|---|
| Total of all 8 reflexive pronouns | 2.32 | 3.79 | 3.82 |

The Groatsworth reflects Chettle's preference for the reflexive pronoun standing alone as subject ("myself have seen"), his habit of repeating the reflexive within a clause, his predilection for itself, and his characteristic use of the phrase of itself. The Groatsworth does not reflect any characteristic Greene use of the reflexives; it does not, for example, have Greene's habitual use of the reflexive pronoun as object of with after a number of verbs.

### 7. Gerund Plurals

| Greene | Chettle | Groatsworth |
|---|---|---|
| .02 | .32 | .36 |

The *Groatsworth* shows Chettle's special liking for gerund plurals, as well as his tendency to use them in series.

### 8. Compound Words

| Type of Compound | Greene | Chettle | Groatsworth |
|---|---|---|---|
| Adj. + Participle | .14 | .44 | .45 |
| Adv. + Participle | .16 | .60 | 1.00 |
| Noun + Participle | .09 | .39 | .73 |
| Total of Participle Compounds | .39 | 1.43 | 2.18 |
| Present Participle Compounds (all) | .04 | .51 | .73 |
| Noun + Pres. Part. | 0.00 | .19 | .27 |
| Compounds with -*like* | .06 | .30 | .27 |
| Compounds with -*thing* | .12 | .42 | .64 |
| Compounds with -*wise* | .03 | .44 | .73 |
| 4 Compounds having highest D.R. | .39 | 1.97 | 2.73 |

The *Groatsworth* reflects Chettle's liking for unusual compounds with *arch*-, *ill*-, and *long*-.

The *Groatsworth* has more compounds in common with Chettle than with Greene.

The *Groatsworth* has 3 cases of the noun + present participle compound, of which Chettle has 8; Greene has none.

## 9. Parentheses

| | | Greene | Chettle | Groatsworth |
|---|---|---|---|---|
| Range in 5 individual works | | .55--1.34 | 1.78--4.69 | --- |
| Frequency rate for all occurrences | | .86 | 3.69 | 4.81 |
| Most frequent initial words in parens | | | | |
| | as | .11 | .62 | 1.18 |
| | for | .11 | .40 | .90 |

The *Groatsworth* and Chettle have more of the same initial words in parens (14) than the *Groatsworth* and Greene (12), although the Greene corpus is two and one-half times as large as the Chettle corpus.

The *Groatsworth* and Chettle have 5 initial words in common that do not occur in Greene, nor in the Greene control text; and 2 of these appear again in the Chettle control text. The *Groatsworth* and Greene have only 3 initial words in common that are not found in the Chettle corpus; and 2 of these appear in the Chettle control text.

## 10. Word-Order Inversion

### *Of* and *By* Phrases

| | Greene | Chettle | Groatsworth |
|---|---|---|---|
| Total of all discriminant categories | 1.34 | 4.75 | 4.38 |
| Total of 4 most highly discriminant categories | 0.10 | 1.39 | 1.64 |
| Percentage of inversion in total usage of prepositional phrases | 4.7 | 13.2 | 16.3 |

In all 13 categories of prepositional phrase inversion which discriminate the two authors, the *Groatsworth* rates approximate those of Chettle, not Greene.

Four categories of prepositional phrase inversion which do not occur at all in Greene occur 36 times in Chettle and 5 times in the *Groatsworth*.

Inversion of prepositional phrase and past participle (as in "by love possessed") never occurs in the Greene corpus; but it occurs at a .37 rate in Chettle and at a .27 rate in the *Groatsworth*.

# V

# "GREENE'S" LETTER TO THE PLAYWRIGHTS: A LINGUISTIC ANALYSIS

The overwhelming cumulative evidence denying Greene's authorship of the *Groatsworth of Wit* as a whole does not necessarily exclude his authorship of the all-important letter containing the attack on Shakespeare. Might not this open letter addressed "To those Gentlemen his Quondam acquaintance, that spend their wits in making plaies" have been an authentic Greene document which Chettle introduced into his pseudo-Greene fabrication? To many, its poignant personal revelations have carried such a ring of truth as to make forgery unthinkable; in fact, the apparent genuineness of this moving message from Greene to his fellow-playwrights has been thought the best warranty for the genuineness of the entire book. Yet the letter contains nothing that Chettle might not have known, familiar as he was with the careers of the leading writers of the day, and, from his vantage-point as a member of the Stationers' Company, thoroughly cognizant too of day-to-day activities in the literary world.

The present hypothesis, in the light also of Chettle's known talents as a literary imitator, is of course that the letter urging "my olde consorts, which have lived as loosely as my selfe" to change their ways, "to be warned by my harms" and "Defer not (with me) till this last point of extremitie", was an integral part of the spurious repentance pamphlet. The reprobate's cautionary farewell address to his former associates was conventional in this species of catchpenny, though ostensibly edifying, popular literature. Chettle's adaptation of the device was a *tour de force* of literary impersonation. Yet it should be remembered that every Elizabethan grammar school boy was taught, through the composition exercise of *prosopopoeia*, how to assume the character of some historical figure and compose the speech that personage might have made under given circumstances; and *Kind-Heart's Dream* displays the future dramatist's skill in such impersonation. The question before us, then, is to determine, if possible, whether or not Chettle's hand, so clearly evident in the linguistic patterns of the rest of the book, can also be detected in the letter to the playwrights.

The letter is only 1127 words long and consequently not likely either to be altogether representative of its author's style, or to afford much scope for the application of stylistic tests. We decided, nevertheless, to make a separate analysis and comparison between the linguistic usages exhibited in the letter and those established as characteristic of Greene and Chettle. Consequently we ran the suite of computer programs on the text of the letter, producing a mini-concordance, as well as an index and a frequency-ordered list of its vocabulary. We then tested it by each of the lexical, morphological, and syntactical criteria that had differentiated the Greene and Chettle styles.

The results (detailed in Tables 44-46) were significant far beyond expectation. For eleven of the thirteen stylistic tests applied, from lexical choice to word-order inversion, the frequency rates appearing in the letter were unmistakably those characteristic of Chettle, and not of Greene. Moreover, specific usages reflected Chettle's idiosyncrasies to a most remarkable degree.

Table 44
LETTER TO THE PLAYWRIGHTS
Comparison with Greene and Chettle Linguistic Preferences

| | Greene-favored Words | Chettle-favored Words | High-Frequency Words (Greene-favored) | High-Frequency Words (Chettle-favored) | Uncommon Words |
|---|---|---|---|---|---|
| Greene | 8.44 | 2.22 | 95.73 | ------ | 0 |
| Chettle | 0.98 | 9.43 | ----- | 21.73 | 6 |
| Letter | 0.89 | 12.42 | 58.56 | 24.84 | 4 |

Table 45

| | Prefixes | Suffixes | Participial Compounds (all categories) | Compounds (Noun and Participle) |
|---|---|---|---|---|
| Greene | 18.76 | 9.09 | 0.39 | .09 |
| Chettle | 31.26 | 17.56 | 1.43 | .39 |
| Letter | 32.81 | 9.72 | 2.66 | .89 |

Table 46

| | Reflexive Pronouns | Parentheses | Prepositional Phrase Inversions (all) | Phrase Inversions (5 highest discriminators) |
|---|---|---|---|---|
| Greene | 2.32 | 0.86 | 1.45 | 0.47 |
| Chettle | 3.79 | 3.64 | 4.74 | 2.59 |
| Letter | 2.66 | 4.81 | 4.44 | 3.54 |

The letter has only one occurrence (the word *aim*) of the words Greene favored and 14 occurrences of 9 different Chettle favorites--namely, *admire*, *anything*, *beseech*, *last* (3), interjection *O*, *pity*, *reprove* (3), *rude*, *while*. If Greene had written it, we should have expected the letter to contain, according to his typical rates for these favorite words, about 9 or 10 occurrences, instead of only one. The expectation, on the other hand, if Chettle wrote it, is for 10 or 11 occurrences of the Chettle marker words and there are actually 14. Similarly, for the high-frequency function words and the like, a Greene letter should show about 108 occurrences of those he favored, whereas the letter to the playwrights shows only 66, a rate of 58.56 compared with the 95.73 characteristic of Greene. A Chettle letter of this length should show about 24 or 25 occurrences of the high-frequency words he favored, and it actually has 28.

The letter has three occurrences of the Chettle marker word *reprove*, which appears only once in the entire Greene corpus. Its ratios of occurrence of the two forms of the second person pronoun, *ye* and *you*, and of the interjection, *O* and *Oh*, both conform to Chettle's, not Greene's, practice. No cases of the -*ever* and -*soever* alternatives occur in the letter. (The -*ever* forms. which do not occur at all in Greene, turn up 3 times, however, in the other sections of the *Groatsworth* written in the first person.) The use of *writ* in compound past tenses, which never occurs in the Greene corpus, is characteristic of Chettle and appears also in the letter: "two more [playwrights] that both have *writ* against these buckram Gentlemen." (It occurs again in the other first person sections: "This is the last I *have writ*.") The letter to the playwrights includes four of the uncommon words in the *Groatsworth* which do not appear in Greene. (Four others appear in the other first-person sections, including *however*, which is used in the preface to the *Groatsworth* just as Chettle most characteristically uses it.)

The rate of usage of participial compounds in the letter corresponds to the much greater usage of these forms by Chettle over Greene, and the letter includes an instance of the noun and participle type which is rare in Greene. Though statistically the frequency rate for reflexive pronouns is closer to Greene's, the letter has the reflexive *itself*, which is very rare in Greene, but not in Chettle; and it has the *of itself* usage which we find repeatedly in Chettle, and not at all in Greene.

Most striking are the reflections in the letter of Chettle's preferences in the two syntactical features, parentheses and word-order inversion. Besides the extraordinarily high occurrence rate of parenthesis in the letter, as in Chettle compared to Greene, six of the ten cases the letter contains can be closely paralleled in Chettle, whereas none can be so identified as characteristic of Greene. The word *were* initiates a parenthesis in the letter, "(were yee in that case *as I* am now)", as it does twice in Chettle and never in Greene. Three parenthetical phrases--"(as myself)", "(I doubt not)", and "(I beseech ye)"--found in the letter appear also in Chettle within parens, as they never do in Greene. The letter has the parenthetic "(with me)", Chettle "(with thee)", whereas Greene in 1371 uses of *with* never has the word initiate a parenthesis. The letter has "(as I *have done*)", Chettle "(as she had done)". Finally, the words which initiate all the parentheses in the letter--*I* (3), *as* (2), *like* (2), *for*, *with*, and *were*--are precisely the words which show far higher rates of frequency as initial words in parens in Chettle's prose than in Greene's; the Greene rate for these six words used initially within parentheses is .27, the Chettle rate is 1.37, and the rate for the letter is 8.08.

The prepositional phrase inverted with the participle (the P + Part category), which does not occur at all in the Greene corpus, but appears 16 times in Chettle, appears 3 times in the *Groatsworth*, and one of these occurrences is in the letter: "Looke but to me, *by him perswaded* to that Libertie, and thou shalt find it an infernal bondage". Another case in the letter of a highly favored Chettle inversion (the 1 + *be* + P + Vpart type) occurs in the words just preceding the attack on Shakespeare: "is it not like that you, to whome they all have beene beholding, shall. . ..*bee* both at once *of them forsaken?*" Greene writes rather "Before *Isabel* should *be forsaken of her*" (N079 21). A third occurs a sentence earlier, in the invective against the actors, and is an instance of another of the Chettle favorites (P + 1 + 2 + 3)--"Base-minded men all three of you, if *by my miserie you be not warnd*."

The evidence of linguistic preferences, in short, provides an independent demonstration of Chettle's authorship of the famous letter to Greene's fellow-playwrights--and, consequently, of the attack on Shakespeare.

# VI

# CONCLUSIONS

## Results of the Investigation

The aim of the investigation was achieved. The technique of computational stylistics provided the means of effectively discriminating the prose styles of Robert Greene and Henry Chettle. It enabled us to assign to Chettle the authorship of the book published as Greene's Groatsworth of Wit. As the Résumé of Linguistic Evidence shows, the patterns of language habit and preference disclosed by a multi-variable analysis of this purported last book of Greene's are far different from those characteristic of his style; and they match very closely those Chettle consistently exhibited in his known writings. The cumulative evidence is of diverse sorts -- lexical, morphological, and syntactical -- and it is both quantitative and qualitative. It resoundingly confirms the hypothesis that the book was a literary forgery by Chettle, published to capitalize on popular interest in Greene following the sensationalized news of his death.

Separate application of the same stylistic criteria to the letter addressed to Greene's scholar-playwright friends produces unmistakable evidence that this oft-quoted document was equally spurious. Though he denied contemporary charges that he had fabricated the Groatsworth of Wit, and apologized to Shakespeare for "Greene's" attack on him as an "upstart Crow beautified with our feathers", Chettle is now revealed as the perpetrator of that famous invective.

We thus have a new story of the first known episode in Shakespeare's career as an actor and playwright. And it is very different from what has hitherto been believed. Moreover, the knowledge that the satirical allusion to the dramatist was part of a publishing hoax entirely changes our perspective upon the attack and the motive behind it. The new perspective may well open the way to a definitive resolution of the two-hundred-year-old debate over how the passage should be interpreted. The attempt to solve this crux, however, lies beyond the scope of the present project.[1]

## Value of the Technique for Authorship Attribution

Electronic data processing made the decisive contribution to the solution of this long-standing case of literary paternity. The technique of computational stylistics made possible the comprehensive survey of all relevant data, and the detection and precise measurement of the distinctive differences in language practices between the two writers which emerged as reliable criteria of authorship. As a result, it proved possible to show statistically that the linguistic preferences exhibited by the writer of the Groatsworth of Wit varied widely from Greene's and corresponded closely to those characteristic of Chettle. Each of ten diverse discriminators, applied as a test to the Groatsworth, gave a negative result for Greene's authorship. In no case, where the frequency and Differential Ratios for the criterion were high enough to be reliable indicators, did the rates of occurrence match those habitual with Greene. On the other hand, all discriminators gave positive results for Chettle's authorship. Despite his effort to counterfeit Greene's style, the tests of lexical and other criteria proved equal to the task of exposing the literary forger. Chettle's hand is shown over and over by the appearance in the book, not only of his typical frequency rates for each of these variables of expression, but also of many of the special or idiosyncratic usages found in his known writings. The overall statistics of rates of occurrence are illuminated with specific cases and concrete examples; and some of these idiosyncrasies, such as Greene's invariable preference for the -soever (howsoever, whatsoever, etc.) over the -ever forms, are almost completely persuasive in themselves: they come close to being fingerprints of the Greene and Chettle styles. Somewhat surprisingly, moreover, the criteria developed proved sensitive enough to demonstrate that the 1127-word letter containing the attack on Shakespeare was of a piece stylistically with the rest of the book. Linguistic practices that are very rare or non-existent in Greene's known prose, but common in Chettle's, turn up in tell-tale fashion in the letter to the playwrights.

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[1] It is the subject of a further study by the same investigator, which is now nearing completion.

## Implications of the Technique for Stylistic Studies

This research is significantly relevant to the development of improved methods for the study and teaching of literary style in college English courses, especially on the advanced undergraduate and the graduate levels. The computer-aided technique described here provides a solid substructure of concrete, measurable, and objectively verifiable data for the study of certain variables of expression. It makes a contribution toward the development for scholarly and educational purposes of a more objective methodology for stylistic analysis than the traditional impressionistic procedures. Generalizations comparing one writer's style with another's may now be based on very specific observations and be supported by quantified data gathered comprehensively and in accordance with objective criteria; and all such generalizations can be verified by independent review of the supporting data.

By this method the variations in language practices which make a given writer's work distinctive may be revealed to students in meaningfully specific terms. The technique provides a way of identifying surely and verifiably the distinctive stylistic traits of a noted author and producing ample evidence for their observation and study. Such a method of analysis does not at all conflict with spontaneous esthetic response or appreciation. Actually, the effect of the close, careful, and detailed study demanded by the computational technique is not to lessen, but rather to enhance, the student's sensitivity to the characteristic features of a writer's style.

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# APPENDIX A

## Texts Concorded by Computer

### Greene Corpus

| Title | Symbol | Edition | Vol. & Pages (word-count) |
|---|---|---|---|
| *Greenes Mourning Garment* (1590) | M | Grosart(1) | IX, 119-222 (22,291) |
| *Greenes Never Too Late* (1590) | N | Grosart(1) | VIII, 5-109 (22,970) |
| *Francescos Fortunes* (1590) | F | Grosart(1) | VIII,115-229 (25,003) |
| *A Notable Discovery of Coosnage* (1591) | D | Harrison(2) | No. I, 7-61 (14,058) |
| *A Quip for an Upstart Courtier* (1592) | Q | Grosart(1) | XI, 209-294 (20,274) |

### Chettle Corpus

| Title | Symbol | Edition | Vol. & Pages (word-count) |
|---|---|---|---|
| *Kind-Hartes Dreame* (1592) | K | Harrison(2) | No.IV, 5-65 (14,012) |
| *Piers Plainness Seven Years' Prenticeship* (1595) | P | Winny(3) | 122-174 (18,278) |
| *Englands Mourning Garment* (1603) | E | Ingleby(4) | 79-116 (10,900) |

(1) Grosart: *The Life and Complete Works in Prose and Verse of Robert Greene*, ed. Alexander B. Grosart, 15 vols., London, 1881-86.

(2) Harrison: *The Bodley Head Quartos*, ed. G.B. Harrison, London, 1922-23.

# APPENDIX A

## Texts Concorded by Computer (continued)

(3) Winny: In *The Descent of Euphues*, ed. James Winny, Cambridge, Eng., 1957.

(4) Ingleby: In *Shakspere Allusion-Books, Part I, 1874*, ed. C. M. Ingleby, London, *New Shakspere Society Publications*, Series IV, no. 1.

### Greene Control Text

| Title | Symbol | Edition | Vol. & Pages (word-count) |
|---|---|---|---|
| *Greenes Farewell to Folly* (1591) | L | Grosart(1) | IX, 227-348<br>(27,914) |

### Chettle Control Texts

| Title | Symbol | Edition | Vol. & Pages (word-count) |
|---|---|---|---|
| *The Tragedy of Hoffman* (1602) | H | Jenkins(5) | 2618 lines<br>(15,096) |
| Epistle in Munday's *Gerileon of England, The Second Part* (1592) | W | Original | Sigs. $A3^v$-$A4^v$ |
| Epistle in Munday's *The Second Book of Primaleon of Greece* (1596) | X | Original | Sigs. $A3^r$-$A4^r$ |
| Epistle in Nashe's *Have With You to Saffron-Walden* (1596) | Y | McKerrow(6) | III,131 |
| Epistle in *Englands Mourning Garment* (1603) | Z | Ingleby(4) | p. 112 |
| Epistles | | Total word-count | (1693) |
| Addition to *John of Bordeaux* | B | Renwick(7) | pp. 10-11 |
| Addition to *Sir Thomas More* (c. 1593) | S | Greg(8) | pp. 66-68 |
| Additions | | Total word-count | (664) |

# APPENDIX A

## Texts Concorded by Computer (continued)

### Disputed Work

| | | | |
|---|---|---|---|
| *Greenes Groats-worth of Witte* (1592) | G | Harrison(2) | No.VI, 6-51 |

(5) Jenkins: *The Tragedy of Hoffman*, ed. H. Jenkins, London, *The Malone Society Reprints 1950* (1951).

(6) McKerrow: *The Works of Thomas Nashe*, ed. R. B. McKerrow, 5 vols., London, 1904-10.

(7) Renwick: *John of Bordeaux*, ed. W. L. Renwick, London, *The Malone Society Reprints* (1936).

(8) Greg: *The Book of Sir Thomas More*, ed. W. W. Greg, London, The Malone Society, 1911.

# APPENDIX B

## Computer Information

### Card Format

| | |
|---|---|
| cols. 1-71 | Text. |
| col. 72 | Letter symbol for the title of the work. |
| cols. 73-75 | Three-digit number locating the page on which the indexed word occurs in the base-text used. |
| col. 76 | Blank. |
| cols. 77-78 | Two-digit number locating the line on the page on which the indexed word occurs. |

### Conventions

One asterisk (*) preceding a letter to indicate capitalization.

Two asterisks (**) to mark the beginning of a paragraph.

Indentation of three spaces to mark a line of interpolated verse.

### Character Substitutions

/ for ;

+ for :

$ for ?

= for !

Type of Computer -- IBM 7094.

Size of storage -- 32,768 words.

Language -- CØBØL.

Number & type of tapes -- two 7-track tapes.

## Samples of Computer Output

Text Printout (*Francesco's Fortunes*, in the Grosart edition of Greene, Vol. VIII, page 189, lines 7-9.)

```
** *MOTHER , *I MAY RIGHTLY COMPARE THE *CHURCH TO A          F189 07
LOOKING-GLASSE / FOR AS MAN MAY SEE HIMSELFE IN THE           F189 08
ONE , AND THERE SEE HIS PROPORTION + SO IN THE OTHER          F189 09
```

### Word Index

A. Individual Work (Chettle, *Kind Heart's Dream*)

```
    WORD                 FREQ          LOCATIONS


BALLAD-SINGING             1        K021 18

BALLADS                    4        K009 13   K015 15   K019 12   K060 08

BAND                       2        K012 14   K050 09
```

B. Aggregate Corpus (Chettle)

```
COMPLAINING                3        E097 98   K051 25   P132 22

COMPLAINS                  1        K062 11
```

### Context (Greene, Aggregate Corpus)

```
WORD   FREQ                    CONTEXT                                 LOCATIONS

VOWED  4   VOWED UNTO *INFIDA , THEY WERE LOST BY THE DISLOYALTIE  F136 13
           HIS FAULTS , DISTRESSED BUT VOWED TO DEVOTION $ HIS     M212 24
           OF THE PRIME OF HER YOUTH VOWED TO *FRANCESCO +         N095 19
           COURTESIE . *IF HARDLY , HE HATH VOWED THAT WHATSOEVER  Q212 13
```

### Frequency Order (Chettle, *Kind-Heart's Dream*)

```
 WORD           FREQ

 THE            601
 TO             415
 OF             380
 AND            323
 A              302
 IN             272
```

# APPENDIX C

## Output of Computer Programs (Printout Pages)

| | Verbal Index | Words in Context | Frequency-Order Listing |
|---|---|---|---|
| Greene (Individual Works)* | | | |
| M | 194 | 506 | 80 |
| N | 204 | 524 | 85 |
| F | 215 | 568 | 89 |
| D | 129 | 313 | 55 |
| Q | 196 | 479 | 83 |
| Totals | 938 | 2390 | 392 |
| Greene (Aggregate Corpus) | 638 | 2225 | 225 |
| Chettle (Individual Works) | | | |
| K | 151 | 332 | 67 |
| P | 187 | 430 | 82 |
| E | 126 | 264 | 57 |
| Totals | 464 | 1026 | 206 |
| Chettle (Aggregate Corpus) | 364 | 972 | 149 |

*For letter symbol interpretation, see Appendix A.

## APPENDIX C (continued)

| | Verbal Index | Words in Context | Frequency-Order Listing |
|---|---|---|---|
| Greene Control Text | | | |
| L | 240 | 633 | 99 |
| Chettle Control Texts | | | |
| H | 170 | 463 | 70 |
| W-X-Y-Z | 29 | 46 | 14 |
| B-S | 15 | 20 | 8 |
| Totals | 214 | 529 | 92 |
| Groatsworth of Wit | | | |
| G | 127 | 267 | 57 |
| Letter to the Playwrights | | | |
| (G039 04--G047 21) | 21 | 32 | 10 |
| First-person Section of G | | | |
| (G039 04--G051 27) | 45 | 77 | 21 |

Grand Total of Computer Printout -------------------- 12,453 pages.

# APPENDIX D

## DISTRIBUTION OF RATES OF OCCURRENCE OF HIGH-FREQUENCY WORDS

WORD: A

| Rate per 2000-Word Block | | RATIO OF BLOCKS TO TOTAL | |
|---|---|---|---|
| | Greene | Chettle | Groatsworth |
| 12.00 - 15.99 | --- | .05 | --- |
| 16.00 - 19.99 | --- | .05 | --- |
| 20.00 - 23.99 | --- | .20 | .20 |
| 24.00 - 27.99 | .04 | .20 | --- |
| 28.00 - 31.99 | .06 | .05 | .20 |
| 32.00 - 35.99 | .10 | .10 | --- |
| 36.00 - 39.99 | .12 | --- | .40 |
| 40.00 - 43.99 | .20 | .20 | .20 |
| 44.00 - 47.99 | .08 | --- | --- |
| 48.00 - 51.99 | .18 | .05 | --- |
| 52.00 - 55.99 | .06 | .05 | --- |
| 56.00 - 59.99 | .06 | --- | --- |
| 60.00 - 63.99 | .08 | --- | --- |
| 64.00 - 67.99 | .02 | --- | --- |
| 68.00 - 71.99 | --- | .05 | --- |

WORD: And

| Rate per 2000-Word Block | | RATIO OF BLOCKS TO TOTAL | |
|---|---|---|---|
| | Greene | Chettle | Groatsworth |
| 32.00 - 35.99 | --- | .05 | --- |
| 36.00 - 39.99 | --- | --- | --- |
| 40.00 - 43.99 | --- | --- | --- |
| 44.00 - 47.99 | .02 | .05 | .20 |
| 48.00 - 51.99 | .02 | .20 | .40 |
| 52.00 - 55.99 | .06 | .10 | .20 |
| 56.00 - 59.99 | --- | .15 | .20 |
| 60.00 - 63.99 | .12 | .20 | --- |
| 64.00 - 67.99 | .06 | .05 | --- |
| 68.00 - 71.99 | .16 | .05 | --- |
| 72.00 - 75.99 | .20 | .05 | --- |
| 76.00 - 79.00 | .10 | --- | --- |
| 80.00 - 83.99 | .04 | .05 | --- |
| 84.00 - 87.99 | .18 | .05 | --- |
| 88.00 - 91.00 | .04 | --- | --- |

## DISTRIBUTION OF RATES OF OCCURRENCE OF HIGH-FREQUENCY WORDS

WORD: AS

| Rate per 2000-Word Block | Greene | RATIO OF BLOCKS TO TOTAL<br>Chettle | Groatsworth |
|---|---|---|---|
| 8.00 - 9.99 | --- | .05 | --- |
| 10.00 - 11.99 | .02 | .05 | --- |
| 12.00 - 13.99 | .02 | .05 | .20 |
| 14.00 - 15.99 | .04 | .05 | .20 |
| 16.00 - 17.99 | .14 | .30 | .20 |
| 18.00 - 19.99 | .04 | .15 | .40 |
| 20.00 - 21.99 | .06 | .15 | --- |
| 22.00 - 23.99 | .12 | .05 | --- |
| 24.00 - 25.99 | .18 | .10 | --- |
| 26.00 - 27.99 | .04 | --- | --- |
| 28.00 - 29.99 | .06 | --- | --- |
| 30.00 - 31.99 | .08 | --- | --- |
| 32.00 - 33.99 | .06 | --- | --- |
| 34.00 - 35.99 | .02 | .05 | --- |
| 36.00 - 37.99 | .04 | --- | --- |
| 38.00 - 39.99 | .04 | --- | --- |
| 40.00 - 41.99 | --- | --- | --- |
| 42.00 - 43.99 | .02 | --- | --- |
| 44.00 - 45.99 | .02 | --- | --- |

Word: NO

| Rate per 2000-Word Block | Greene | RATIO OF BLOCKS TO TOTAL<br>Chettle | Groatsworth |
|---|---|---|---|
| 2.00 - 2.99 | .06 | --- | --- |
| 3.00 - 3.99 | .06 | --- | --- |
| 4.00 - 4.99 | .14 | .05 | --- |
| 5.00 - 5.99 | .04 | --- | --- |
| 6.00 - 6.99 | .20 | .05 | --- |
| 7.00 - 7.99 | .12 | .15 | .40 |
| 8.00 - 8.99 | .12 | .10 | .40 |
| 9.00 - 9.99 | .12 | .15 | --- |
| 10.00 - 10.99 | .02 | .10 | --- |
| 11.00 - 11.99 | .08 | .10 | --- |
| 12.00 - 12.99 | --- | .05 | .20 |
| 13.00 - 13.99 | .02 | .10 | --- |
| 14.00 - 14.99 | .02 | .15 | --- |

## DISTRIBUTION OF RATES OF OCCURRENCE OF HIGH-FREQUENCY WORDS

### WORD: BY

| Rate per 2000-Word Block | | RATIO OF BLOCKS TO TOTAL | |
|---|---|---|---|
| | Greene | Chettle | Groatsworth |
| 2.00 - 2.99 | .02 | --- | --- |
| 3.00 - 3.99 | .02 | --- | --- |
| 4.00 - 4.99 | .02 | --- | --- |
| 5.00 - 5.99 | .04 | --- | --- |
| 6.00 - 6.99 | .12 | --- | --- |
| 7.00 - 7.99 | .10 | .05 | .20 |
| 8.00 - 8.99 | .06 | .10 | --- |
| 9.00 - 9.99 | .10 | .05 | --- |
| 10.00 - 10.99 | .06 | .05 | --- |
| 11.00 - 11.99 | .08 | .10 | .20 |
| 12.00 - 12.99 | .10 | --- | --- |
| 13.00 - 13.99 | .08 | .20 | --- |
| 14.00 - 14.99 | .08 | .05 | --- |
| 15.00 - 15.99 | .02 | .05 | --- |
| 16.00 - 16.99 | --- | .15 | --- |
| 17.00 - 17.99 | .02 | --- | .20 |
| 18.00 - 18.99 | --- | .10 | .20 |
| 19.00 - 19.99 | .04 | --- | .20 |
| 20.00 - 20.99 | --- | .05 | --- |
| 21.00 - 21.99 | .02 | --- | --- |
| 22.00 - 22.99 | .02 | --- | --- |
| 23.00 - 23.99 | --- | .05 | --- |

### WORD: DOWN

| Rate per 2000-Word Block | | RATIO OF BLOCKS TO TOTAL | |
|---|---|---|---|
| | Greene | Chettle | Groatsworth |
| 0.00 - .99 | .12 | .45 | .40 |
| 1.00 - 1.99 | .26 | .25 | --- |
| 2.00 - 2.99 | .16 | .05 | .40 |
| 3.00 - 3.99 | .28 | .20 | .20 |
| 4.00 - 4.99 | .06 | .05 | --- |
| 5.00 - 5.99 | .06 | --- | --- |
| 6.00 - 6.99 | .04 | --- | --- |
| 7.00 - 7.99 | --- | --- | --- |
| 8.00 - 8.99 | .02 | --- | --- |

## DISTRIBUTION OF RATES OF OCCURRENCE OF HIGH-FREQUENCY WORDS

### WORD: NOR

| Rate per 2000-Word Block | RATIO OF BLOCKS TO TOTAL<br>Greene | <br>Chettle | <br>Groatsworth |
|---|---|---|---|
| 0.00 - .99 | .08 | .30 | .80 |
| 1.00 - 1.99 | .20 | .40 | --- |
| 2.00 - 2.99 | .28 | .20 | --- |
| 3.00 - 3.99 | .14 | --- | .20 |
| 4.00 - 4.99 | .10 | .05 | --- |
| 5.00 - 5.99 | .14 | .05 | --- |
| 6.00 - 6.99 | .02 | --- | --- |
| 7.00 - 7.99 | .04 | --- | --- |

### WORD: NOW

| Rate per 2000-Word Block | RATIO OF BLOCKS TO TOTAL<br>Greene | <br>Chettle | <br>Groatsworth |
|---|---|---|---|
| 0.00 - .99 | .14 | --- | --- |
| 1.00 - 1.99 | .16 | .10 | --- |
| 2.00 - 2.99 | .32 | .10 | --- |
| 3.00 - 3.99 | .18 | .40 | .20 |
| 4.00 - 4.99 | .08 | .05 | .20 |
| 5.00 - 5.99 | .02 | .05 | --- |
| 6.00 - 6.99 | .04 | .15 | .20 |
| 7.00 - 7.99 | .04 | .05 | .20 |
| 8.00 - 8.99 | --- | --- | --- |
| 9.00 - 9.99 | --- | .05 | --- |
| 10.00 - 10.99 | --- | .05 | --- |
| 11.00 - 11.99 | .02 | --- | --- |
| 12.00 - 12.99 | --- | --- | .20 |

# DISTRIBUTION OF RATES OF OCCURRENCE OF HIGH-FREQUENCY WORDS

## WORD: ONLY

| Rate per 2000-Word Block | RATIO OF BLOCKS TO TOTAL | | |
|---|---|---|---|
| | Greene | Chettle | Groatsworth |
| 0.00 - .99 | .10 | --- | .20 |
| 1.00 - 1.99 | .38 | .15 | .20 |
| 2.00 - 2.99 | .22 | .05 | .20 |
| 3.00 - 3.99 | .22 | .30 | --- |
| 4.00 - 4.99 | .06 | .20 | .20 |
| 5.00 - 5.99 | .02 | --- | .20 |
| 6.00 - 6.99 | --- | .20 | --- |
| 7.00 - 7.99 | --- | --- | --- |
| 8.00 - 8.99 | --- | .05 | --- |
| 9.00 - 9.99 | --- | .05 | --- |

## WORD: SO

| Rate per 2000-Word Block | RATIO OF BLOCKS TO TOTAL | | |
|---|---|---|---|
| | Greene | Chettle | Groatsworth |
| 5.00 - 5.99 | --- | .05 | --- |
| 6.00 - 6.99 | .02 | --- | --- |
| 7.00 - 7.99 | .02 | .05 | --- |
| 8.00 - 8.99 | --- | .10 | --- |
| 9.00 - 9.99 | .02 | .15 | --- |
| 10.00 - 10.99 | .06 | .15 | .20 |
| 11.00 - 11.99 | .04 | --- | .20 |
| 12.00 - 12.99 | .06 | .10 | .20 |
| 13.00 - 13.99 | .06 | .10 | --- |
| 14.00 - 14.99 | .10 | .15 | .20 |
| 15.00 - 15.99 | .02 | .05 | .20 |
| 16.00 - 16.99 | .12 | .10 | --- |
| 17.00 - 17.99 | .18 | --- | --- |
| 18.00 - 18.99 | .10 | --- | --- |
| 19.00 - 19.99 | .06 | --- | --- |
| 20.00 - 20.99 | --- | --- | --- |
| 21.00 - 21.99 | .04 | --- | --- |
| 22.00 - 22.99 | .04 | --- | --- |
| 23.00 - 23.99 | .02 | --- | --- |
| 24.00 - 24.99 | .02 | --- | --- |
| . . . | | | |
| 30.00 - 30.99 | .02 | --- | --- |

## DISTRIBUTION OF RATES OF OCCURRENCE OF HIGH-FREQUENCY WORDS

### WORD: SOME

| Rate per 2000-Word Block | RATIO OF BLOCKS TO TOTAL | | |
|---|---|---|---|
| | Greene | Chettle | Groatsworth |
| 0.00 - .99 | .12 | --- | --- |
| 1.00 - 1.99 | .16 | --- | .40 |
| 2.00 2.99 | .20 | .10 | .20 |
| 3.00 - 3.99 | .14 | .05 | .20 |
| 4.00 - 4.99 | .12 | .20 | --- |
| 5.00 - 5.99 | .08 | .05 | .20 |
| 6.00 - 6.99 | .04 | .20 | --- |
| 7.00 - 7.99 | .02 | .10 | --- |
| 8.00 - 8.99 | .04 | .10 | --- |
| 9.00 - 9.99 | --- | .05 | --- |
| 10.00 - 10.99 | .02 | .15 | --- |
| 11.00 - 11.99 | .02 | --- | --- |
| 12.00 - 12.99 | .02 | --- | --- |
| 13.00 - 13.99 | --- | --- | --- |
| 14.00 - 14.99 | .02 | --- | --- |

### WORD: THEN

| Rate per 2000-Word Block | RATIO OF BLOCKS TO TOTAL | | |
|---|---|---|---|
| | Greene | Chettle | Groatsworth |
| 1.00 - 1.99 | .04 | .15 | --- |
| 2.00 - 2.99 | .02 | .25 | .40 |
| 3.00 - 3.99 | .12 | .35 | --- |
| 4.00 - 4.99 | .16 | .05 | .20 |
| 5.00 - 5.99 | .10 | .15 | --- |
| 6.00 - 6.99 | .14 | --- | .20 |
| 7.00 - 7.99 | .12 | .05 | --- |
| 8.00 - 8.99 | .06 | --- | --- |
| 9.00 - 9.99 | .06 | --- | --- |
| 10.00 - 10.99 | .04 | --- | .20 |
| 11.00 - 11.99 | .04 | --- | --- |
| 12.00 - 12.99 | .02 | --- | --- |
| 13.00 - 13.99 | .04 | --- | --- |
| 14.00 - 14.99 | --- | --- | --- |
| 15.00 - 15.99 | --- | --- | --- |
| 16.00 - 16.99 | --- | --- | --- |
| 17.00 - 17.99 | .02 | --- | --- |
| 18.00 - 18.99 | .02 | --- | --- |

## DISTRIBUTION OF RATES OF OCCURRENCE OF HIGH-FREQUENCY WORDS

WORD: SUCH

| Rate per 2000-Word Block | RATIO OF BLOCKS TO TOTAL | | |
|---|---|---|---|
| | Greene | Chettle | Groatsworth |
| 0.00 - .99 | --- | --- | .40 |
| 1.00 - 1.99 | .04 | .05 | .20 |
| 2.00 - 2.99 | .02 | .05 | --- |
| 3.00 - 3.99 | .02 | .15 | --- |
| 4.00 - 4.99 | .10 | .15 | .20 |
| 5.00 - 5.99 | .08 | --- | .20 |
| 6.00 - 6.99 | .10 | .20 | --- |
| 7.00 - 7.99 | .16 | .30 | --- |
| 8.00 - 8.99 | .14 | .05 | --- |
| 9.00 - 9.99 | .04 | --- | --- |
| 10.00 - 10.99 | .10 | --- | --- |
| 11.00 - 11.99 | .02 | .05 | --- |
| 12.00 - 12.99 | .06 | --- | --- |
| 13.00 - 13.99 | .02 | --- | --- |
| 14.00 - 14.99 | --- | --- | --- |
| 15.00 - 15.99 | .02 | --- | --- |
| 16.00 - 16.99 | .06 | --- | --- |
| 17.00 - 17.99 | --- | --- | --- |
| 18.00 - 18.99 | .02 | --- | --- |

WORD: UP

| Rate per 2000-Word Block | RATIO OF BLOCKS TO TOTAL | | |
|---|---|---|---|
| | Greene | Chettle | Groatsworth |
| 0.00 - .99 | .08 | .05 | .20 |
| 1.00 - 1.99 | .12 | .30 | .20 |
| 2.00 - 2.99 | .10 | .40 | .40 |
| 3.00 - 3.99 | .26 | .20 | .20 |
| 4.00 - 4.99 | .18 | .05 | --- |
| 5.00 - 5.99 | .08 | --- | --- |
| 6.00 - 6.99 | .02 | --- | --- |
| 7.00 - 7.99 | .10 | --- | --- |
| 8.00 - 8.99 | .04 | --- | --- |
| 9.00 - 9.99 | --- | --- | --- |
| 10.00 - 10.99 | --- | --- | --- |
| 11.00 - 11.99 | .02 | --- | --- |

## DISTRIBUTION OF RATES OF OCCURRENCE OF HIGH-FREQUENCY WORDS

### WORD: UPON

| Rate per 2000-Word Block | Greene | RATIO OF BLOCKS TO TOTAL<br>Chettle | Groatsworth |
|---|---|---|---|
| 0.00 - .99 | .02 | .30 | .20 |
| 1.00 - 1.99 | .16 | .15 | .60 |
| 2.00 - 2.99 | .12 | .25 | --- |
| 3.00 - 3.99 | .18 | .20 | --- |
| 4.00 - 4.99 | .14 | .05 | --- |
| 5.00 - 5.99 | .22 | --- | --- |
| 6.00 - 6.99 | .08 | .05 | .20 |
| 7.00 - 7.99 | .06 | --- | --- |
| 8.00 - 8.99 | --- | --- | --- |
| 9.00 - 9.99 | --- | --- | --- |
| 10.00 - 10.99 | .02 | --- | --- |

### WORD: WHEN

| Rate per 2000-Word Block | Greene | RATIO OF BLOCKS TO TOTAL<br>Chettle | Groatsworth |
|---|---|---|---|
| 0.00 - .99 | .02 | --- | --- |
| 1.00 - 1.99 | .02 | .05 | .20 |
| 2.00 - 2.99 | .06 | .15 | --- |
| 3.00 - 3.99 | .06 | .20 | .20 |
| 4.00 - 4.99 | .10 | --- | .20 |
| 5.00 - 5.99 | .14 | .20 | --- |
| 6.00 - 6.99 | .16 | .15 | .20 |
| 7.00 - 7.99 | .04 | .10 | .20 |
| 8.00 - 8.99 | .10 | .05 | --- |
| 9.00 - 9.99 | .06 | .10 | --- |
| 10.00 - 10.99 | .12 | --- | --- |
| 11.00 - 11.99 | .08 | --- | --- |
| 12.00 - 12.99 | --- | --- | --- |
| 13.00 - 13.99 | --- | --- | --- |
| 14.00 - 14.99 | .02 | --- | --- |
| . . . | | | |
| 28.00 - 28.99 | .02 | --- | --- |

## DISTRIBUTION OF RATES OF OCCURRENCE OF HIGH-FREQUENCY WORDS

WORD: WHICH

| Rate per 2000-Word Block | RATIO OF BLOCKS TO TOTAL<br>Greene | Chettle | Groatsworth |
|---|---|---|---|
| 1.00 - 1.99 | .04 | .05 | --- |
| 2.00 - 2.99 | .10 | .05 | --- |
| 3.00 - 3.99 | .26 | --- | --- |
| 4.00 - 4.99 | .12 | .10 | --- |
| 5.00 - 5.99 | .20 | .15 | --- |
| 6.00 - 6.99 | .10 | .10 | --- |
| 7.00 - 7.99 | .08 | .15 | --- |
| 8.00 - 8.99 | .02 | .10 | .60 |
| 9.00 - 9.99 | .04 | .10 | .20 |
| 10.00 - 10.99 | .02 | .05 | --- |
| 11.00 - 11.99 | --- | .05 | .20 |
| 12.00 - 12.99 | --- | --- | --- |
| 13.00 - 13.99 | .02 | --- | --- |
| 14.00 - 14.99 | --- | .05 | --- |
| 15.00 - 15.99 | --- | --- | --- |
| 16.00 - 16.99 | --- | --- | --- |
| 17.00 - 17.99 | --- | .05 | --- |

# APPENDIX E

## Inverted Prepositional Phrases

## OF and BY

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## CLASSIFICATION

## OF PREPOSITIONAL PHRASE INVERSIONS

- I. NOUN MODIFIERS
  - A. Partitive
  - B. Non-partitive
- II. ADJECTIVE MODIFIERS
- III. VERBAL MODIFIERS
  - A. Participle
    - 1. Past Participle
    - 2. Present + Past Participle
    - 3. Present Participle
  - B. Infinitive + Participle
  - C. Infinitive
- IV. PREDICATE MODIFIERS
  - A. Verb Modifiers
    - 1. P + 1 + 2 + 3
    - 2. 1 + P + 2 + 3
      - a. 1 + P + V + 3
      - b. 1 + P + v + V + 3
        - (1) 1 + P + be + Vpart + 3
        - (2) 1 + P + v + Vpart + 3
        - (3) 1 + P + v + Vinf + 3
      - c. 1 + v + P + V + 3
        - (1) 1 + be + P + Vpart
        - (2) 1 + v + P + Vpart
        - (3) 1 + v + P + Vinf
    - 3. 1 + 2 + P + 3
    - 4. P + Rel
    - 5. Split Phrases
  - B. Reflexive Phrases
  - C. Adverb-equivalent Phrases

# Greene: OF Phrases

## I. NOUN MODIFIERS

### A. Partitive

#### 1. Superlative and Comparative Phrases*

| | | |
|---|---|---|
| D 011 09 | For of all divelish practices this is the most prejudicial | P + superl. |
| D 022 27 | Mark then of al the greatest pack which is the undermost | P + superl. |
| F 154 24 | of two evils chuse the least | P + superl. |
| F 184 04 | thinke of all parts the meane is the merriest | P + superl. |
| F 221 16 | of all the cities in Europe, Venice hath most semblance of Venus vanities | P + superl. |
| M 123 20 | Schollers of all men [are] deepest intangled | P + superl. |
| M 123 24 | of all flowres the Rose soonest withereth | P + superl. |
| M 169 15 | love being of al the passions in man the most excellent | P + superl. |
| M 169 17 | to the eye of al the parts the most pure | P + superl. |
| N 044 04 | but of two extremes... choose that [which] may have least prejudice and most profit | P + superl. |
| Q 223 15 | A brawling curre of all bites the least | P + superl. |

---

* These "of all" phrases, controlled by superlatives, are all classified as "noun modifiers" for the sake of consistency, although one case in Greene and one in Chettle are not actually noun modifiers.

| | | |
|---|---|---|
| Q 261 13 | Your backs of all other should be the best tanned | P + superl. |
| Q 292 08 | yet of the two I hold the Plaier to be the better Christian | P + superl. |

2. P + Number

| | | |
|---|---|---|
| D 054 16 | that make of thirty sacks some 56 | P + no. |
| F 218 11 | Must Eurymachus of all these three bee the man that must make up the match | P + no. |
| M 157 18 | I must choose...of all these but one | P + no. |
| Q 257 28 | and of al he knew but three | P + no. |

B. Non-partitive (no cases)

II. ADJECTIVE MODIFIERS (no cases)

III. VERBAL MODIFIERS (no cases)

IV. PREDICATE MODIFIERS

A. Verb Modifiers

1. P + 1 + 2 + 3

| | | |
|---|---|---|
| F 211 14 | of a fewe particular instances, conclude not generall axiomes | P + /1/ + 2 + 3 |
| Q 241 28 | for of a wealthy esquiers sonne, hee makes a threadbare beggar | P + 1 + 2 + 3 |
| Q 242 01 | and of a scornefull Tailor, hee lifts up an upstart scurvy gentleman | P + 1 + 2 + 3 |
| Q 292 16 | and of our almes the proudest of them all doth live | P + 1 + 2 + 3 |

2. 1 + P + 2 + 3

a. 1 + P + V + 3

| | | |
|---|---|---|
| M 122 17 | Diogenes of a coyner of money became a Corrector of manners | 1 + P + 2 + 3 |

b. 1 + P + v + V + 3 (no cases)

c. 1 + v + P + V + 3 (no cases)

3. 1 + 2 + P + 3

| | | |
|---|---|---|
| D 056 08 | I bought of a countrie collier two sackes for thirteene pence | 1 + 2 + P + 3 |
| D 056 10 | and I bought of this Knave three sackes | 1 + 2 + P + 3 |
| Q 287 12 | You buy of the Garbellers of spices, the refuse that they | 1 + 2 + P + 3 |

4. OF + Rel*

| | | |
|---|---|---|
| M 199 04 | love is a thing, I know not of what it commeth | of + rel |
| Q 239 28 | asked him of what occupation he was? | of + rel + N |
| Q 242 24 | I inquired of what occupation hee was | of + rel + N |

5. Split Phrases

| | | |
|---|---|---|
| D 009 04 | abuses, which /they/... shadow with the name of Arts as never have been heard of ... before | be + Vpart + of (passive) |
| D 024 02 | Which was the card he had a glaunce of | V + of + N -- N + V + of |
| D 033 14 | What profession then are you of? | V + of + N -- N + V + of |
| F 133 28 | a matter that I long doubted of | V + of + N -- N + V + of |
| M 145 09 | this we carowse of to ease our hearts thirst | V + of + N -- N + V + of |
| N 024 16 | ... their generall essence ... better decipher by Mantuan than I can make description of | V + of + N -- N + V + of |

---

* This category includes both relative pronouns and adjectives, both "of which" and "of which envie".

| | | |
|---|---|---|
| N 082 01 | Much runnes by the mill that the Miller never knowes of | V + of + N -- N + V + of |
| Q 216 16 | What kind they were of I knewe not | V + of + N -- N + V + of |
| Q 226 24 | Where thou art highly accounted of | be + Vpart + of (passive) |
| Q 271 18 | glad there were so many accepted of at once | be + Vpart + of (passive) |

### B. Reflexive Phrases

| | | |
|---|---|---|
| F 132 15 | of thyselfe [i.e. by means of thine own wit] thou canst say nothing | P + 1 + 2 + 3 |

### C. Adverb-equivalent Phrases

| | | |
|---|---|---|
| D 009 08 | two such pestilent and prejudiciall practises, as of late have been the ruine of infinite persons | 1 + P + 2 + 3 |
| D 047 15 | pretie tale of late performd in Bishopgate street | P + part |
| M 188 17 | thou that of late diddest swim in gluttony | 1 + P + 2 |
| D 021 05 | That of force the cony must see it | P + 1 + 2 + 3 |
| D 026 07 | three knaves must of force come together | 1 + v + P + V |
| D 029 19 | so that of force the carde... must come forth first | P + 1 + 2 |
| M 144 15 | May I therefore of courtesie crave your direction to some place of rest | v + 1 + P + V + 3 |
| N 019 25 | Let me crave of courtesie whither thou dost bend the end of thy pilgrimage. | /1/ + V + (Inf + P + N) |
| Q 239 01 | of truth I hold thee so in penal statutes. | P + 1 + 2 + 3 |

| | | |
|---|---|---|
| Q 245 24 | I have knowne of late when a poore woman laid a silver thimble ... to pawne | 1 + 2 + P + 3 |
| Q 267 25 | He must of force proclaime himselfe mine enimy | 1 + v + P + V + 3 |
| Q 294 14 | hee is but of late time a raiser of rents and an enemy | 1 + 2 + P + 3 |

# Chettle: OF Phrases

## I. NOUN MODIFIERS

### A. Partitive

#### 1. Superlative and Comparative Phrases

| | | |
|---|---|---|
| K 037 04 | thou sufferest slaunder ..., thereby approving thyself to be of all other most slack | P + superl. |
| P 168 06 | Of all other least fearing Licosthenes | P + superl. |

#### 2. P + Number

| | | |
|---|---|---|
| P 142 26 | of a thousand pounds he had scarce ten to pay | P + no. |
| E 084 12 | His undoubted heire King Henry of famous memory the eight | P + no. |

### B. Non-partitive

| | | |
|---|---|---|
| E 088 03 | could of their goods have no restitution | P + N |
| K 013 17 | he was of singular pleasaunce the verye supporter | P + N |

## II. ADJECTIVE MODIFIERS

| | | |
|---|---|---|
| E 093 09 | being of a fellow too meane | P + A |
| K 013 10 | a man ... of face amible | P + A |
| K 013 10 | /a man/ ... of body well-proportioned | P + A |
| K 036 06 | of their end they are not sure | P + A |
| P 123 29 | of body strong ... | P + A |
| P 123 29 | ... of wit prompt ... | P + A |
| P 123 29 | ... of speech not altogether rude | P + A |
| P 142 04 | Celinus was not then of my master altogether unmindful | P + A |

| | | |
|---|---|---|
| P 148 13 | Of Aemilius, Aeliana never heard inough | P + A |
| P 172 01 | one of you that of his owne nature seemeth not ill inclinde | P + A |

## III. VERBAL MODIFIERS

### A. Participle

#### 1. Part Participle

| | | |
|---|---|---|
| P 126 05 | Popular hee was and liberall, of king and people well beloved. | P + Part |
| P 169 17 | with whom Rhodope ... dwelt, of him and all the neighbors derely beloved | P + Part |

#### 2. Present + Past Participle (no cases)

#### 3. Present Participle

| | | |
|---|---|---|
| P 127 01 | Shall we there murder Hylenus, no more of me meriting the name of father ...? | P + Pres. Part. |

### B. Infinitive + Participle

| | | |
|---|---|---|
| P 124 03 | assist mee to be of this doubt resolvde | to be + P + Part |
| P 149 29 | what reason hast thou of his affection to bee perswaded? | P + to be + Part |
| P 159 28 | Shee ... practisde of her owne injurie to be wreakt | P + to be + Part |

### C. Infinitive

| | | |
|---|---|---|
| P 132 26 | of him to speake more I have no pleasure | P + Inf. |
| E 088 24 | would please God of his inestimable mercie, to roote out all malice | P + Inf. |
| K 027 20 | havinge a poore manne of a legge to dismember | P + Inf. |

## IV. PREDICATE MODIFIERS

### A. Verb Modifiers

#### 1. P + 1 + 2 + 3

| | | |
|---|---|---|
| E 097 05 | and of them, they that they are best able scarce remember | P + 1 + 2 |
| E 096 19 | of her mercie nothing can be saide more | P + 1 + 2 |
| E 097 13 | of a person more excellent ... I speake | P + 1 + 2 |
| K 026 29 | of him I will say little | P + 1 + 2 + 3 |
| K 044 23 | of them I will say no more | P + 1 + 2 + 3 |
| K 044 23 | Of the profession so much hath Pierce Pennilesse spoken, that ... | P + 3 + v + 1 + V |
| P 129 18 | of a private man I have made thee a Prince | P + 1 + 2 + 3 |
| P 135 02 | of their happiness no man can glory | P + 1 + 2 + 3 |
| P 147 02 | of a pheasant (if intreated) shee would sometimes feede. | P + 1 + 2 |
| P 147 04 | of her, him, and myselfe *Plura Sequuntur*: | P + 1 + 2 |
| P 124 28 | of them what thinkst thou | P + 3 + 2 + 1* |
| E 095 15 | which of her benigne mercie he obtained | 3 + P + 1 + 2 |
| K 028 07 | of the one it may bee saide | P + it + 2 + 1 |

---

*Variations in placement pattern, such as the last six cases in this category, occur when the basic sentence elements are inverted, but the prepositional phrase in consistently classified by its position relative to the subject and verb.

| | | |
|---|---|---|
| K 028 10 | yet of the other may directly bee concluded that | P + 2 + 1 |
| P 142 27 | faire words of the father he had ... | 3 + P + 1 + 2 |
| P 142 27 | ... fairer of the daughter | 3 + P + /1 + 2/ |

2. 1 + P + 2 + 3

a. 1 + P + V + 3

| | | |
|---|---|---|
| E 091 20 | Death of him got victorie | 1 + P + 2 + 3 |
| P 125 26 | a Persian hand-maid, that of private grudge poysoned the new delivered Queene | 1 + P + 2 + 3 |
| P 129 17 | I of thy prince became thy fatherly protector | 1 + P + 2 + 3 |

b. 1 + P + v + V + 3

(1) 1 + P + be + Vpart + 3

| | | |
|---|---|---|
| P 127 13 | for never shall Prince of Thrace of his birthright be dispossest | v + 1 + P + be + Vpart |

(2) 1 + P + v + Vpart + 3 (no cases)

(3) 1 + P + v + Vinf + 3 (no cases)

c. 1 + v + P + V + 3

(1) 1 + be + P + Vpart + 3

| | | |
|---|---|---|
| K 012 10 | Tarlton, who ... was of all men liked | 1 + be + P + Vpart |
| K 012 16 | his jerkin was of leather cut | 1 + be + P + Vpart |
| K 019 07 | (if it prove true that is of him reported) | 1 + be + P + Vpart |
| K 047 01 | they are possest; the poore of that comfort dispossest | 1 + /be/ + P + Vpart* |

---

*Ellipses, common in Chettle, are classified as though the missing verb were positioned in the abbreviated clause as it is in the completed one.

| | | |
|---|---|---|
| P 146 11 | was within the houre of another fitted | 1 + be + P + Vpart |

(2) 1 + v + P + Vpart + 3 (no cases)

(3) 1 + v + P + Vinf + 3 (no cases)

3. 1 + 2 + P + 3

| | | |
|---|---|---|
| K 048 06 | The Land-Lord scarce asketh of the tenant thankes | 1 + 2 + P + 3 |
| K 053 13 | there bee such ... who ... get of some a crowne, ... | 1 + 2 + P + 3 |
| K 053 13 | ... of others a noble, ... | /1 + 2/ + P + 3 |
| K 053 14 | ... of divers a pound | /1 + 2/ + P + 3 |
| P 153 30 | If ever Rhegius merited of thee kinde favour | 1 + 2 + P + 3 |

4. Of + Rel

| | | |
|---|---|---|
| E 088 08 | of which perfidious gilt she never was tainted | of + rel + N |
| E 093 29 | the reward of which mercy and charitie she now finds | of + rel + N |
| K 013 13 | Robert Greene ... of whome ... I have learned to speake | of + rel |
| K 018 17 | of whomesoever they buy them | of + rel |
| K 018 21 | an honest handicraft, of which the realme more need than jygging vanities | of + rel |
| K 021 10 | of which nomber it is not neccessary to make them that have seene no number of yeares | of + rel + N |
| K 029 21 | eie water through the vertue of whiche, you have attained the woorshipfull name of ... | N + of + rel |
| K 035 08 | I will certifie thee a little of my disquiet after death, of which I thinke thou either hast not heard or wilt not conceive | of + rel |
| K 035 20 | For my bookes, of what kind soever, I refer their commendation or dispraise to those | of + rel + N |

| | | |
|---|---|---|
| P 143 22 | of which he intending never to make profit, easely consented | of + rel |
| P 150 03 | of whose love were I assured | of + rel + N |
| P 154 07 | of which envie ...love is onely original | of + rel + N |
| P 158 20 | of whose service thy servant now intreates | of + rel + N |
| P 160 02 | of all which she would put Flavius in possession by her marriage | of + rel |
| P 161 05 | of which Celinus hath endevoured to work the downfall | of + rel |

5. Split Phrases

| | | |
|---|---|---|
| E 087 33 | Lumbardy ... they are possessed of | V + of + N → N + V + of |
| E 104 16 | Other pallaces shee had great store of | V + of + N → N + V + of |
| K 032 14 | ... the charmer I told ye of | V + of + N → N + V + of |
| K 039 05 | ... A merrie knave ... that for this two years day hath not beene talkt of | be + Vpart + of (passive) |
| K 053 18 | they make the lawes of the Realme be ill spoken of | be + Vpart + of (passive) |
| P 152 30 | hee had serious affaires to conferre with her of | V + of + N → N + V + of |
| P 159 17 | for what account are schollers made of? | V + of + N → N + V + of |
| P 165 19 | one half I make thee master of | N + of + N → N + N + of |
| P 169 21 | whose turmoyled estate when she heard of | V + of + N → N + V + of |

B. Reflexive Phrases

| | | |
|---|---|---|
| E 096 14 | they ... that of themselves had none | 1 + P + 2 + 3 |

| | | |
|---|---|---|
| K 021 02 | that poore base life, of itselfe too badde | P + A |
| P 139 06 | what of thyselfe thou promisedst | 3 + P + 1 + 2 |

### C. Adverb-equivalent Phrases

| | | |
|---|---|---|
| K 016 28 | the eie, whose light first failing the body of force descends to darkness | 1 + P + 2 |
| P 168 15 | whome of certaintie they thought the storme had wracked | 3 + P + 1 + 2 |

## Groatsworth: OF Phrases

I. NOUN MODIFIERS (no cases)

II. ADJECTIVE MODIFIERS

| | | |
|---|---|---|
| G 022 20 | sith either of you are of other so fond at the first signt | P + A |

III. VERBAL MODIFIERS

A. Participle

1. Past Participle

| | | |
|---|---|---|
| G 015 19 | you have wealth to maintaine her, of women not little longed for | P + Part |

2. Present + Part Participle (no cases)

3. Present Participle (no cases)

B. Infinitive + Participle (no cases)

C. Infinitive (no cases)

IV. PREDICATE MODIFIERS

A. Verb Modifiers

1. P + 1 + 2 + 3

| | | |
|---|---|---|
| G 088 25 | and of the other I will make no doubt | P + 1 + 2 + 3 |
| G 015 05 | Of them I am assured you have your choyce | P + 1 + 2 + 3 |
| G 018 27 | For of such places it may be said as of hell | P + it + 2 + 1 |
| G 036 24 | Of these hee knew the casts to cog at cards | P + 1 + 2 + 3 |

2. 1 + P + 2 + 3

a. 1 + P + V + 3 (no cases)

b. 1 + P + v + V + 3 (no cases)

c. 1 + v + P + V + 3

(1) 1 + be + P + Vpart + 3

| | | |
|---|---|---|
| G 022 14 | She should be of him injuriously forsaken | 1 + v + be + P + Vpart |
| G 045 24 | It is not like that you... be both at once them forsaken? | 1 + be + P + Vpart |

(2) 1 + v + P + Vpart + 3

(3) 1 + v + P + Vinf + 3

3. 1 + 2 + P + 3

| | | |
|---|---|---|
| G 014 03 | The youth was of condition simple | 1 + be + P + 3 |

4. OF + Rel

| | | |
|---|---|---|
| G 008 10 | anything, of whiche hee living might make use | of + rel |
| G 037 13 | Of which one, brother to a brothell hee kept, was trust under a tree as round as a Ball | of + rel |
| G 041 29 | of which myselfe am instance | of + rel |

5. Split Phrases (no cases)

B. Reflexive Phrases

| | | |
|---|---|---|
| G 019 10 | his good report ... were of itselfe enough to give him deserved entertainement | 1 + be + P + 3 |
| G 047 10 | Mans time is not of itselfe so short | 1 + be + P + 3 |

C. Adverb-equivalent Phrases

| | | |
|---|---|---|
| B 018 04 | Whence of purpose he let fall a handfull of Angels | P + 1 + 2 + 3 |
| G 022 12 | Shee must of necessity be infortunate | 1 + v + P + be + 3 |

# Greene: BY Phrases

I. NOUN MODIFIERS (no cases)

II. ADJECTIVE MODIFIERS (no cases)

III. VERBAL MODIFIERS

A. Participle

1. Past Participle (no cases)*

2. Present + Past Participle (no cases)

3. Present Participle

| | | |
|---|---|---|
| M 192 27 | hyd him home ... by the way traversing many countries | P + Pres. Part. |

B. Infinitive + Participle (no cases)

C. Infinitive

| | | |
|---|---|---|
| F 144 03 | if ever it lay in her by any meanes to procure it | P + Inf. + N |
| F 161 23 | I would not ... agree by defiling my husband's bed to fulfill his ... desires | P + Inf. + N |
| F 173 26 | the swayne that indevoured by his labour to redresse every losse | P + Inf. + N |
| N 015 19 | thou wandrest ...; and seekest now by the sight of a strange land to satisfy those follies ... | P + Inf. + N |
| Q 213 13 | Vertues taught men ... to think...and by their secret properties to checke wanton and sensual imperfections | P + Inf. + N |
| Q 242 17 | as if they meant by their appearance to preach | P + inf. |

---

*One case (F 170 01) appears in verse, which was not included in the study.

| | | |
|---|---|---|
| Q 262 03 | You ... make the good and well-tanned Leather by your villany to fleet and wast away | P + Inf + 3 |

## IV. PREDICATE MODIFIERS

### A. Verb Modifiers

### 1. P + 1 + 2 + 3

| | | |
|---|---|---|
| D 019 14 | since by mistaking I have made you slacke your business | P + 1 + 2 + 3 |
| D 032 02 | by signes and broken English, they got him in for a cony | P + 1 + 2 + 3 |
| D 034 23 | because by a multitude of hateful rules ... they exercise their villanies | P + 1 + 2 + 3 |
| D 049 28 | by that /time/ the gentleman had stolne a nap | P + 1 + 2 + 3 |
| F 129 08 | by this meanes his want was releeved | P + 1 + 2 |
| F 134 06 | though by her unkindnesse he was proved haggard | P + 1 + 2 + 3 |
| F 149 01 | by this small offence ... thou shalt both content me and purchase to thyselfe ... | P + 1 + 2 + 3 |
| F 167 16 | and by their help ... he in short time tooke his journey | P + 1 + 2 + 3 |
| F 173 27 | by this meanes he waxed private and familiar with ... | P + 1 + 2 + 3 |
| F 183 24 | so by our falling out we shall be better friends | P + 1 + 2 + 3 |
| F 192 17 | by my judgement you shall be sold to the Butcher | P + 1 + 2 |
| M 120 20 | as if by this I should infer that it was ... | P + 1 + 2 + 3 |
| M 145 19 | Yet unlesse by great fortune, you shall misse of the way | P + 1 + 2 + 3 |
| M 147 05 | By this /time/, they were come to the hill | P + 1 + 2 |

| | | |
|---|---|---|
| M 169 14 | and so by consequence in humane creatures, love ... alotteth herselfe to the eye | P + 1 + 2 + 3 |
| M 169 24 | by these premises Sir, then I infer that ... | P + 1 + 2 + 3 |
| M 209 15 | as soone as by drawing too oft the well waxed drie | P + 1 + 2 + 3 |
| N 038 18 | and how by no meanes (except by her) he could convay anie letter | P + 1 + 2 + 3 |
| N 038 18 | ... (except by her) ... | (P) + 1 + 2 + 3 |
| N 065 02 | by his industry he had not onely great favour but gote wealth to withstand fortune | P + 1 + 2 + 3 |
| N 082 18 | by her therefore hee was conducted to Infidas closet | P + 1 + 2 |
| Q 211 17 | lest by kicking where they are toucht, they bewray | P + 1 + 2 + 3 |
| Q 211 18 | and by starting up to finde fault, /they/ prove themselves upstarts and fools | P + /1/ + 2 + 3 |
| Q 231 10 | yea by me the cheefest part of the realme is governed | P + 1 + 2 |
| Q 231 20 | if by the favour of their Prince and their owne desarts they merited them | P + 1 + 2 + 3 |
| Q 240 12 | Alas by me hee getteth small | P + 1 + 2 + 3 |
| Q 240 14 | unlesse by misfortune his shieres slipp away | P + 1 + 2 |
| Q 241 26 | and by this reason the Tailor plaies Gods part | P + 1 + 2 + 3 |
| Q 261 04 | by the ancient lawes and statutes of England you should let a hide lye | P + 1 + 2 + 3 |

| | | |
|---|---|---|
| F 156 11 | by this meanes what a discredite shall I bring | P + 3 + v + 1 + V* |
| M 165 26 | I would by outward demonstration you could conjecture | 1 + 2 + (P + 1 + 2) |
| M 167 06 | I feare by long looking, he wil surfet | 1 + 2 + (P + 1 + 2) |
| Q 265 23 | by Mercurys boone it grew that | P + it + 2 + 1 |
| Q 268 24 | that by his art he was a Skinner | P + 1 + 2 + 3 |
| Q 291 03 | the first whom by his ... gate I imagined ... | 3 + P + 1 + 2 |

2. 1 + P + 2 + 3

a. 1 + P + V + 3

| | | |
|---|---|---|
| D 027 27 | The barnacle ... by chopping a carde winnes two of the five | 1 + P + V + 3 |
| D 032 27 | A Shomaker ... came ... and by chaunce fel among cony catchers | 1 + P + V + 3 |
| F 131 24 | The Actors, by continuall use grewe not onely excellent, but | 1 + P + V + 3 |
| F 185 23 | as the Chrisocoll and the gold by long striving together growe to be one metal | 1 + P + V + 3 |
| N 033 09 | My Wife by her countenaunce seemed to be ... content | 1 + P + V + 3 |
| N 104 13 | hotehouses, which by little and little sweate a man into a consumption | 1 + P + V + 3 |
| Q 213 12 | and to think nature by her weeds warnd men to be wary | 1 + P + V + 3 |
| Q 263 12 | the currier by that means undooeth the other shoomakers | 1 + P + V + 3 |

---

*Variations such as the last six cases in this category result from inversion in the major sentence elements, but all the cases are basically "P + (1 + 2 + 3)."

b. 1 + P + v + V + 3

(1) 1 + P + be + Vpart + 3

| | | |
|---|---|---|
| D 010 10 | good things by ill wits are wrested to the worse | 1 + P + be + Vpart + 3 |
| D 010 26 | The poore Prentice ... by these pestilent vipers ... is smoothly entised | 1 + P + be + Vpart |
| F 216 08 | Such a malladie as by no meanes can be cured | 1 + P + v+be+Vpart |
| N 060 01 | Francesco by thee is fallen into such misfortunes | 1 + P + be + Vpart |

(2) 1 + P + v + Vpart + 3

| | | |
|---|---|---|
| Q 233 22 | Some that by wearing of velvet breeches ... have proved | 1 + P + v + Vpart |
| M 168 21 | such Physicions as by anatomizing have particularly set downe | 1 + P + v + Vpart |

(3) 1 + P + v + Vinf + 3

| | | |
|---|---|---|
| M 153 23 | the eye by viewing might surfet | 1 + P + v + Vinf |
| Q 236 13 | who by pooling or selling of land ... will bestow all to buy an office | 1 + P + v + Vinf + 3 |

c. 1 + v + P + V + 3

(1) 1 + be + P + Vpart + 3

| | | |
|---|---|---|
| D 015 03 | Farmers, who God wotte be by them ledde like sheep | 1 + be + P + Vpart |
| M 119 07 | Such as mourned ... were by prescript and peremptorie charge commanded | 1 + be + P + Vpart |
| M 144 24 | to that we are by courtesie bound | 1 + be + P + Vpart |
| N 056 22 | was by Francesco robde of his only jewell | 1 + be + P + Vpart |

(2) 1 + v + P + Vpart + 3

| | | |
|---|---|---|
| N 101 12 | After these two lovers had by the space of three yeares securely slumbred | 1 + v + P + Vpart |
| D 011 29 | The Taker-up ... who hath by long travell learned without Booke a thousand pollicies | 1 + v + P + Vpart |

(3) 1 + v + P + Vinf + 3

| | | |
|---|---|---|
| F 222 15 | I shal ... by the insight ... return both the more warie and the more wise | 1 + v + P + Vinf |
| N 052 27 | the old goose could spie the gosling winke, and woulde not by anie meanes trust her | 1 + v + P + Vinf |
| N 053 04 | Fregoso could by no subtill drifts so warely watch his transformed Io, but ... | 1 + v + P + Vinf |
| D 045 01 | then will shee ... by some pollicie or other fall aboord on him | v + 1 + P + Vinf |
| F 154 21 | thou shalt by consent keepe the report of thy chastitie | 1 + v + P + Vinf |
| F 154 22 | and by deniall gaine shame with infamie | /1 + v/ + P + Vinf |
| M 121 15 | if any young gentlemen or schollers shall wear this weed ... and by the vertue thereof weane themselves from wanton desires | 1 + v + P + Vinf |
| M 195 22 | so either shalt thou draw her on to bee fond, or else by such absence shake off thine own folly | v + 1 + P + Vinf |
| Q 242 26 | ... have you any pawnes ... No, quoth I, nor by the help of God never will have | /1/ + P + v + Vinf |

3. 1 + 2 + P + 3

| | | |
|---|---|---|
| D 033 18 | you ... are by your art a Cony-catcher | 1 + 2 + P + 3 |

| | | |
|---|---|---|
| F 171 15 | which Isabel seeing, conceived *by his outward griefes* his inward passions | 1 + 2 + P + 3 |
| F 221 10 | We crave by your owne promise the reason | 1 + 2 + P + 3 |
| M 128 18 | Fortune ... gave him by one wife two sonnes | 1 + 2 + P + 3 |
| M 148 16 | fortune ... gave him by a young wife a young daughter | 1 + 2 + P + 3 |
| N 054 25 | thou maist see by my attire the depth of my fancie | 1 + 2 + P + 3 |
| Q 271 24 | he was an honest man ... by his occupation a bricklaier | 1 + 2 + P + 3 |
| Q 294 04 | Clothbreeches is by many hundred yeares more antient | 1 + 2 + P + 3 |
| F 124 28 | I sawe by the workes of nature the course of the world | 1 + 2 + P + 3 |

4. BY + Rel

| | | |
|---|---|---|
| D 035 22 | but by what honest gaines I may get never comes within the compass of my thought | By + rel |
| D 036 15 | by what meanes soever I care not | By + rel |
| N 007 01 | the man by whose meanes this *Nunquam sera* came to light | By + rel |
| N 084 02 | you are the Loadstone by whose vertue my thoughts take all ... | By + rel |
| D 010 23 | By which meanes he, his wife and children, is brought to utter ruine | By + rel |
| D 059 26 | and by whom thou wilt be tried | By + rel |

5. Split Phrases (no cases)

B. Reflexive Phrases (no cases)

C. Adverb-equivalent Phrases (no cases)

# Chettle: BY Phrases

## I. NOUN MODIFIERS (no cases)

## II. ADJECTIVE MODIFIERS

| | | |
|---|---|---|
| E 093 34 | Her wisedome was ... in her life by any unequalled | P + A |
| K 025 17 | travelers that by incision are able to ease | P + A |
| P 165 09 | /he/ by privie whisprings and rustling of armed men without was sure of his deceit | P + A |

## III. VERBAL MODIFIERS

### A. Participle

#### 1. Past Participle

| | | |
|---|---|---|
| E 091 36 | by her owne hand their corrupt sores toucht, ... was a sign | P + Part |
| K 005 08 | that gravitie of enditing by the elder exercised is ... | P + Part |
| K 019 14 | pamphlets by the state forbidden | P + Part |
| K 020 17 | injuries, by them everywhere offered | P + Part |
| K 054 10 | one of these pettifogging jugglers ... by long sollicitership got in to be an odd atturney was ... | P + Part |
| K 056 24 | Hee ... by the report of his men bruted for a cunning man, grew ... | P + Part |
| P 129 24 | His leud life ... (by thee most of anie other noated and misliked) | P + Part |
| P 132 01 | Six thousand persons ... each by other murdred | P + Part |

| | | |
|---|---|---|
| P 139 34 | strict lawes by Celinus abrogated | P + Part |
| P 145 26 | crownes ... by what extortion I know not raised | P + Part |
| P 161 12 | a secret ... by your wisedomes suspected | P + Part |
| P 167 08 | the remisse life of Celinus ... by Celydon soothed in ill | P + Part |
| P 167 08 | by his counsell disinherited | P + Part |
| P 167 33 | the Commons (by some turbulent person stirred up) | P + Part |

2. Present + Past Participle

| | | |
|---|---|---|
| E 091 15 | Shee having by example of things past nothing doubted of things to come | Pres. Part. + P + Part |
| E 101 04 | Elizabeth nor any ... subjects would obay, being no way by Gods word thereunto warranted | Pres. Part. + P + Part |
| K 011 09 | whence (by my hostisse care) being removed to a pleasant parlor | P + Pres. Part. + Part. |
| K 012 03 | treble viol ... on which (by his continuall sawing having left but one string) hee gave me a huntsup | P + Pres. Part. + Part |
| K 043 07 | which time having been by the magistrates wisely observed | Pres. Part + Part. + P + Part. |

3. Present Participle

| | | |
|---|---|---|
| K 014 26 | so by chance lighting first on Antony Nowenowe, I found | P + Pres. Part. |
| K 025 14 | Phisitions ... by defensives preventing paine | P + Pres. Part. |
| K 026 20 | he by chance getting the deceivers glass, would needes | P + Pres. Part. |
| K 053 20 | a poore old man by chance comming into | P + Pres. Part. |

| | | |
|---|---|---|
| P 142 31 | Celydon by degrees growing greater than hee, curbd | P + Pres. Part. |
| P 170 16 | the hollowe of a rocke, in which by degrees ascending ... | P + Pres. Part. |

B. Infinitive + Participle

| | | |
|---|---|---|
| E 093 15 | the poore woman found by the same fellowe to be wrongd | P + Inf. + Part. |
| P 153 25 | My lament, no way by griefe able to be lessened | P + Inf. + Part. |

C. Infinitive

| | | |
|---|---|---|
| E 086 05 | and by that example to have every cobler account himself a King | P + Inf. |
| E 088 18 | adventured their owne lives by treacherie to cut off the lives | P + Inf. |
| E 090 13 | went about by poyson to have tooke away the life of | P + Inf. |
| P 133 30 | /none/ were able by incantations, hearbes, or spells, to enforce liking | P + Inf. |
| P 133 33 | he determines ... by some false cry to traine her from her traine | P + Inf. |
| P 157 33 | she thus attempted by pilfrie to breake into his ... | P + Inf. |

## IV. PREDICATE MODIFIERS

### A. Verb Modifiers

1. P + 1 + 2 + 3

| | | |
|---|---|---|
| E 083 18 | Now and then by sighing they exprest their hearts sorrow | P + 1 + 2 + 3 |
| E 096 29 | and by a jurie he was found guiltie and adjudged to die | P + 1 + 2 + 3 |
| K 007 03 | though by the workemans error T.N. were set to the end | P + 1 + 2 + 3 |

| | | |
|---|---|---|
| K 013 20 | and by them in post past a knight of the post | P + 2 + 1 |
| K 015 07 | Whereas by the daily recourse of infinit numbers to the infernall regions ... I am given to understand that | P + 1 + 2 + 3 |
| K 023 08 | til by the force of his kinder heeles, he utterly undid two milch maydens | P + 1 + 2 + 3 |
| K 024 29 | by his cunning hee so dealt that | P + 1 + 2 |
| K 025 02 | by the ey that was first sore he can with much adoo looke through a christall | P + 1 + 2 + 3 |
| K 025 25 | by strong conceipt some have comfort | P + 1 + 2 + 3 |
| K 032 02 | by charmes they can ... fray away the payne | P + 1 + 2 + 3 |
| K 040 24 | by overmuch heat sometime they are in both places infectious | P + 1 + 2 + 3 |
| K 041 24 | by honest courses I can never paye the rent | P + 1 + 2 + 3 |
| K 046 03 | by their avarice Religion is slandered | P + 1 + 2 |
| K 051 18 | by then your diet was drest ... | P + 1 + 2 |
| K 052 19 | for by that tricke he provd himself a toward youth | P + 1 + 2 + 3 |
| K 058 17 | by his skill the theeves had no power to carry them farther | P + 1 + 2 + 3 |
| K 063 01 | on a Summers evening by the edge of the Forrest, she chaunst to meete the forenamed farmers wife | P + 1 + 2 + 3 |
| P 127 34 | by attending on whose trencher, hee got bare maintenance | P + 1 + 2 + 3 |
| P 135 12 | by this thy charitie ... thou meritest a greater name | P + 1 + 2 + 3 |

|  |  |  |
|---|---|---|
| P 133 26 | but that by reason of her gard he feared | P + 1 + 2 |
| P 131 13 | by then the tumult was appeasd | P + 1 + 2 |
| P 138 31 | by her Coronet of golde ... he thought hir no meane personage | P + 1 + 2 + 3 |
| P 142 11 | and by that time the most part of it was welnigh worth nothing | P + 1 + 2 + 3 |
| P 142 17 | (as by all his honestie he protested) | P + 1 + 2 |
| P 153 12 | By prayer wee shall prevaile | P + 1 + 2 |
| P 158 30 | and by then I returned, olde Ulpian my master was readie to rise | P + 1 + 2 + 3 |
| P 168 11 | by the diligence of the magistrates the people were appeased | P + 1 + 2 |
| P 172 03 | for by like counsell and self conspiracie, am I cast downe | P + v + 1 + V |
| K 012 07 | the next, by his sute of russet, ... I knew to be ... | 3 + P + 1 + 2 |
| P 146 22 | goods ... that by collusion hee had raked together | 3 + P + 1 + 2 |
| K 026 28 | what expectation was of him, by his great promises all London knowes | 3 + P + 1 + 2 |
| K 010 14 | by concealing it I might doe myselfe harme ... | P + 1 + v + Vinf + 3 |
| K 010 15 | by revealing it, /I might/ ease my heart | P + /1+v/ + Vinf +3 |
| P 150 19 | By the first thou wert separated from my father and sister | P + 1 + 2 + 3 |
| P 150 20 | ... by the last /thou wert/ bereft of thy wonted senses | P + /1+v/ + V + 3 |

2. 1 + P + 2 + 3

a. 1 + P + V + 3

| | | |
|---|---|---|
| E 101 32 | She ... by expresse statutes appointed all | 1 + P + V + 3 |
| K 032 18 | Traveling ... I by the way chaunst to be cald to conferre | 1 + P + 2 |
| P 126 07 | who by publicke Edict proclaimed Aemilius his heir | 1 + P + 2 + 3 |
| P 168 06 | Licosthenes, who by the way arrested him of high treason | 1 + P + 2 |
| K 054 21 | ... /Heretikes/ by their practises seeke to make | 1 + P + 2 |
| P 170 08 | he by his demeanor obtained the frendship | 1 + P + 2 + 3 |

b. 1 + P + v + V + 3

(1) 1 + P + be + Vpart + 3

| | | |
|---|---|---|
| K 018 26 | both these by the law are burned in the eare | 1 + P + be + Vpart |
| K 065 15 | coosener that by a justice was sent to Winchester | 1 + P + be + VPart |
| P 129 08 | the intention by Celydons owne mouth /was/ uttred | 1 + P + be + Vpart |
| P 146 13 | the gentlemen and merchant ... by my masters evidence were in law convicted | 1 + P + be + Vpart |
| P 161 19 | The vertuous father by the vicious sonne ... /are banished/ | 1 + P + /be+Vpart/ |
| P 161 20 | the harmless brother and sister by their ... brother are banished | 1 + P + be + Vpart |
| P 167 34 | /the commons/ would by no reason | 1 + v + P + be + Vpart |
| P 129 26 | wilt thou by him be so sodainely commanded? | v + 1 + P + be + Vpart |

| | | |
|---|---|---|
| E 102 21 | many abroad by corruption were winkt at | 1 + P + be + Vpart |

(2) 1 + P + v + Vpart + 3

| | | |
|---|---|---|
| P 163 20 | the Senatours by advise of an eloquent Oratour ... had thus decreed | 1 + P + v + Vpart |

(3) 1 + P + v + Vinf + 3

| | | |
|---|---|---|
| K 026 26 | one ... that by wondrous ready meanes would heal madmen | 1 + P + v + Vinf + 3 |
| K 053 10 | there bee such that by that trick can make a vacation time quicker | 1 + P + v + Vinf + 3 |

c. 1 + v + P + V + 3

(1) 1 + be + P + Vpart + 3

| | | |
|---|---|---|
| E 090 03 | Smyth was by the Oneill sent bound to the deputie | 1 + be + P + Vpart |
| E 091 06 | was by her milde sufference admitted to depart | 1 + be + P + Vpart |
| K 005 26 | a letter .. is offensively by one or two of them taken | 1 + be + P + Vpart |
| K 011 04 | I was thus by visible apparitions disturbd | 1 + be + P + Vpart |
| K 021 09 | is by a kinde of tolleration permitted only to beggars | 1 + be + P + Vpart |
| K 040 15 | halfe the day is by most youthes ... spent uppon them | 1 + be + P + Vpart |
| K 054 06 | His simplenes was by the hearers well taken | 1 + be + P + Vpart |
| K 060 08 | Ballads that are by authority forbidden | 1 + be + P + Vpart |
| K 064 02 | hidden treasure is by spirits possest | 1 + be + P + Vpart |
| K 065 07 | /the farmer/ was by his wife counselled to stay | 1 + be + P + Vpart |

| | | |
|---|---|---|
| P 141 32 | my master was by his Baylie and the Broker perswaded | 1 + be + P + Vpart |
| P 160 30 | but that was by Celinus to the publique officers denied | 1 + be + P + Vpart |
| P 167 30 | Licosthenes ... was by the captain ... demanded a reason for his armed approach | 1 + be + P + Vaprt |
| K 040 12 | houses ... should be by their continuance impoverished | 1 + v + be + P + Vpart |
| P 155 03 | Affection ... will neyther bee by reason restrained ... | 1 + v + be + P + Vpart |
| P 155 03 | /affection ... will neyther bee .../ nor by extremitie bridled | /1 + v + be/ + P + Vpart |

(2) 1 + v + P + Vpart + 3

| | | |
|---|---|---|
| E 093 26 | whom she hath by her bountie delivered from | 3 + 1 + v + P + Vpart |
| K 024 01 | scoffers ... have intermedled ... and by that folly effected much lesse than | 1 + v + P + Vpart |

(3) 1 + v + P + Vinf + 3

| | | |
|---|---|---|
| E 103 08 | His Royall Majestie shall by the treasure finde | 1 + v + P + Vinf |
| K 033 14 | these fellows ... might by their practice ..., men ease | 1 + v + P + Vinf |
| K 064 07 | I will by morning tell ye whether ... | 1 + v + P + Vinf |

3. 1 + 2 + P + 3

| | | |
|---|---|---|
| P 123 33 | Lycostes ... had by entertaignement of straglers strange misfortunes | 1 + 2 + P + 3 |
| E 084 30 | Learne by this worthie Queene the care of Soveraignes | 1 + 2 + P + 3 |

| | | |
|---|---|---|
| E 090 19 | ... shee ... punished by fine and imprisoment a wealthy railer | 1 + 2 + P + 3 |
| K 026 19 | the Gentlewoman ... was put by her husband quite out of comfort | 1 + 2 + P + 3 |
| P 142 13 | Yet had we by silkes small profit | 1 + 2 + P + 3 |

4. By + Rel

| | | |
|---|---|---|
| P 153 02 | and by whose wisedome our Estate is warely guided | By + rel |
| E 095 27 | by which meanes, murderers and presumptuous offenders were [illegible] off from all hope | By + rel |
| K 016 18 | by whome that excelent Art is not smally slandered | By + rel |
| K 028 27 | By which were men so mad to beleeve you | By + rel |
| P 172 27 | By which meanes being ascertained it was hee, I ... | By + rel |

5. Split Phrases

| | | |
|---|---|---|
| E 085 16 | There is no greater marke for a true shepheard to be knowne by | V + by + N→<br>N + V + by |

B. Reflexive Phrases (no cases)

C. Adverb-equivalent Phrases (no cases)

## Groatsworth: BY Phrases

I. NOUN MODIFIERS (no cases)

II. ADJECTIVE MODIFIERS (no cases)

III. VERBAL MODIFIERS

A. Participle

1. Past Participle

| | | |
|---|---|---|
| G 015 16 | a man by nature furnished with all exquisite proportion | P + Part |
| G 144 19 | ... me, by him perswaded to that libertie | P + Part |

2. Present + Past Participle (no cases)

3. Present Participle (no cases)

B. Infinitive + Participle

| | | |
|---|---|---|
| G 027 11 | vext to bee by a peasant so abusde | to be + P + Part |

C. Infinitive

| | | |
|---|---|---|
| G 024 07 | Roberto ... seek not by sly insinuation to turne our mirth to sorrow | P + inf |

IV. PREDICATE MODIFIERS

A. Verb Modifiers

1. P + 1 + 2 + 3

| | | |
|---|---|---|
| G 010 12 | Here by the way Gentlemen must I digresse to shewe the reason of Gorinius present speech | P + v + 1 + V |
| G 015 12 | by conversing with such, you will be accounted a Gentleman | P + 1 + 2 + 3 |
| G 023 16 | by the Foxes perswasion there would bee a perpetuall league | P + there + 2 + 1 |

| | | |
|---|---|---|
| G 042 02 | so deale that by thy wilfulness thyselfe want not | P + 1 + 2 + 3 |
| G 030 28 | sith by Roberto she posseseth the prize, Roberto merites | P + 1 + 2 + 3 |
| G 033 19 | if by outward habit men should be censured | P + 1 + 2 |
| G 035 01 | by conversing with bad company, be grew *a malo in peius* | P + 1 + 2 + 3 |
| G 036 25 | by these he learnd the legerdemaines | P + 1 + 2 + 3 |
| G 045 16 | if by my miserie you be not warnd | P + 1 + 2 |

2. 1 + P + 2 + 3

a. 1 + P + V + 3

| | | |
|---|---|---|
| G 035 04 | Lucanio, who by this time began to droop | 1 + P + V |

b. 1 + P + v + V + 3

(1) 1 + P + be + Vpart + 3

| | | |
|---|---|---|
| G 025 20 | the matter by him should be discovered | 1 + P + v + be + Vpart |
| G 025 29 | If you will by me bee advizde | 1 + v + P + be + Vpart |

(2) 1 + P + v + Vpart + 3

| | | |
|---|---|---|
| G 007 19 | he had good experience in a Noverint, and by the universall tearmes ... had driven | 1 + P + v + Vpart + 3 |

(3) 1 + P + v + Vinf + 3 (no cases)

c. 1 + v + P + V + 3

(1) 1 + be + P + Vpart + 3

| | | |
|---|---|---|
| G 008 18 | was at last with his last summons by a deadly disease arrested | 1 + be + P + Vpart |

| | | |
|---|---|---|
| G 008 19 | was by Phisitions given over | 1 + be + P + Vpart |
| G 013 27 | was by Lucanio his sonne interd | 1 + be + P + Vpart |
| G 014 02 | store is by Lucanio lookyd into | 1 + be + P + Vpart |
| G 014 20 | Lucanio was by his brother brought to the bush | 1 + be + P + Vpart |
| G 024 03 | the badger was by the shepherds dogs werried | 1 + be + P + Vpart |

(2) 1 + v + P + Vpart + 3

| | | |
|---|---|---|
| G 032 29 | I have by chaunce heard you discourse | 1 + v + P + Vpart |

(3) 1 + v + P + Vinf + 3

| | | |
|---|---|---|
| G 039 11 | I will be my repentaunce indevor to doo all men good | 1 + v + P + Vinf + 3 |

3. 1 + 2 + P + 3

| | | |
|---|---|---|
| G 009 19 | they have not returned by their day that adored creature | 1 + v + Vpart + P + 3 |
| G 022 10 | love that lasteth gathereth by degrees his liking | 1 + V + P + 3 |
| G 033 15 | for men of my profession gette by schollers their whole living | 1 + V + P + 3 |
| G 038 06 | God released by that verdit the innocent | 1 + V + P + 3 |
| G 024 16 | (as women are by nature proud) | 1 + be + P + 3 |

4. By + rel

| | | |
|---|---|---|
| G 049 07 | By which /pit/ hee likewise ingravde this Epitaph | By + rel |
| G 025 05 | by what means ... hee might steale away the Bride | By + rel |

5. Split Phrases (no cases)

B. Reflexive Phrases (no cases)

C. Adverb-equivalent Phrases (no cases)

# APPENDIX F

## 1.

### Prepositional Inversions
### OF Phrases

| | GREENE | | CHETTLE | | GROATSWORTH OF WIT | |
|---|---|---|---|---|---|---|
| | Occurr-ences | per 1000 words | Occurr-ences | per 1000 words | Occurr-ences | per 1000 words |
| NOUN MODIFIERS | 17 | .162 | 6 | .139 | 0 | .000 |
| A. Partitive | 17 | .162 | 4 | .092 | 0 | .000 |
| B. Non-partitive | 0 | .000 | 2 | .046 | 0 | .000 |
| ADJECTIVE MODIFIERS | 0 | .000 | 10 | .232 | 1 | .091 |
| VERBAL MODIFIERS | 0 | .000 | 9 | .208 | 1 | .091 |
| A. Participle | 0 | .000 | 3 | .069 | 1 | .091 |
| 1. Past Participle | 0 | .000 | 2 | .046 | 1 | .091 |
| 2. Present + Past Part. | 0 | .000 | 0 | .000 | 0 | .000 |
| 3. Present Participle | 0 | .000 | 1 | .023 | 0 | .000 |
| B. Infinitive + Participle | 0 | .000 | 3 | .069 | 0 | .000 |
| C. Infinitive | 0 | .000 | 3 | .069 | 0 | .000 |
| PREDICATE MODIFIERS | 34 | .325 | 61 | 1.412 | 14 | 1.273 |
| A. Verb Modifiers | 21 | .201 | 54 | 1.250 | 10 | .909 |
| 1. P + 1 + 2 + 3 | 4 | .038 | 16 | .370 | 4 | .364 |
| 2. 1 + P + 2 + 3 | 1 | .010 | 9 | .208 | 2 | .182 |
| a. 1 + P + V + 3 | 1 | .010 | 3 | .069 | 0 | .000 |
| b. 1 + P + v + V + 3 | 0 | .000 | 1 | .023 | 0 | .000 |
| (1) 1+P+be+Vpart+3 | 0 | .000 | 1 | .023 | 0 | .000 |
| (2) 1+P+v +Vpart+3 | 0 | .000 | 0 | .000 | 0 | .000 |
| (3) 1+P+v +Vinf +3 | 0 | .000 | 0 | .000 | 0 | .000 |
| C. 1 + v + P + V + 3 | 0 | .000 | 5 | .116 | 2 | .182 |
| (1) 1+be+P+Vpart+3 | 0 | .000 | 5 | .116 | 2 | .182 |
| (2) 1+v +P+Vpart+3 | 0 | .000 | 0 | .000 | 0 | .000 |
| (3) 1+v +P+Vinf +3 | 0 | .000 | 0 | .000 | 0 | .000 |
| 3. 1 + 2 + P + 3 | 3 | .029 | 5 | .116 | 1 | .091 |
| 4. P + Rel | 3 | .029 | 15 | .347 | 3 | .273 |
| 5. Split Phrases | 10 | .096 | 9 | .208 | 0 | .000 |
| B. Reflexive Phrases | 1 | .010 | 3 | .069 | 2 | .182 |
| C. Adv.-equivalent Phrases | 12 | .115 | 2 | .046 | 2 | .182 |
| TOTAL | 51 | .488 | 84 | 1.944 | 16 | 1.435 |

# APPENDIX F

## 2.

## Prepositional Inversions
## BY Phrases

| | GREENE | | CHETTLE | | GROATSWORTH OF WIT | |
|---|---|---|---|---|---|---|
| | Occurrences | per 1000 words | Occurrences | per 1000 words | Occurrences | per 1000 words |
| NOUN MODIFIERS | 0 | .000 | 0 | .000 | 0 | .000 |
| A. Partitive | 0 | .000 | 0 | .000 | 0 | .000 |
| B. Non-partitive | 0 | .000 | 0 | .000 | 0 | .000 |
| ADJECTIVE MODIFIERS | 0 | .000 | 3 | .069 | 0 | .000 |
| VERBAL MODIFIERS | 8 | .076 | 33 | .764 | 4 | .364 |
| A. Participle | 1 | .010 | 25 | .579 | 2 | .182 |
| 1. Past Participle | 0 | .000 | 14 | .324 | 2 | .182 |
| 2. Present + Past Part. | 0 | .000 | 5 | .116 | 0 | .000 |
| 3. Present Participle | 1 | .010 | 6 | .139 | 0 | .000 |
| B. Infinitive + Participle | 0 | .000 | 2 | .046 | 1 | .091 |
| C. Infinitive | 7 | .067 | 6 | .139 | 1 | .091 |
| PREDICATE MODIFIERS | 81 | .774 | 85 | 1.968 | 28 | 2.545 |
| A. Verb Modifiers | 81 | .774 | 85 | 1.968 | 28 | 2.545 |
| 1. P + 1 + 2 + 3 | 35 | .335 | 35 | .810 | 9 | .818 |
| 2. 1 + P + 2 + 3 | 31 | .296 | 39 | .903 | 12 | 1.091 |
| a. 1 + P + V + 3 | 8 | .076 | 6 | .139 | 1 | .091 |
| b. 1 + P + v + V + 3 | 8 | .076 | 12 | .278 | 3 | .273 |
| (1) 1+P+be+Vpart+3 | 4 | .038 | 9 | .208 | 2 | .182 |
| (2) 1+P+v +Vpart+3 | 2 | .019 | 1 | .023 | 1 | .091 |
| (3) 1+P+v +Vinf +3 | 2 | .019 | 2 | .046 | 0 | .000 |
| c. 1 + v + P + V + 3 | 15 | .143 | 21 | .486 | 8 | .727 |
| (1) 1+be+P+Vpart+3 | 4 | .038 | 16 | .370 | 6 | .545 |
| (2) 1+v +P+Vpart+3 | 2 | .019 | 2 | .046 | 1 | .091 |
| (3) 1+v +P+Vinf +3 | 9 | .086 | 3 | .069 | 1 | .091 |
| 3. 1 + 2 + P + 3 | 9 | .086 | 5 | .116 | 5 | .455 |
| 4. P + Rel | 6 | .057 | 5 | .116 | 2 | .182 |
| 5. Split Phrases | 0 | .000 | 1 | .023 | 0 | .000 |
| B. Reflexive Phrases | 0 | .000 | 0 | .000 | 0 | .000 |
| C. Adv.-equivalent Phrases | 0 | .000 | 0 | .000 | 0 | .000 |
| TOTAL | 89 | .851 | 121 | 2.801 | 32 | 2.909 |

# APPENDIX F

## 3.

## Prepositional Inversions
## OF + BY Phrases

| | GREENE | | CHETTLE | | GROATSWORTH OF WIT | |
|---|---|---|---|---|---|---|
| | Occurrences | per 1000 words | Occurrences | per 1000 words | Occurrences | per 1000 words |
| NOUN MODIFIERS | 17 | .163 | 6 | .139 | 0 | .000 |
| A. Partitive | 17 | .163 | 4 | .093 | 0 | .000 |
| B. Non-partitive | 0 | .000 | 2 | .046 | 0 | .000 |
| ADJECTIVE MODIFIERS | 0 | .000 | 12 | .278 | 1 | .091 |
| VERBAL MODIFIERS | 8 | .076 | 42 | .972 | 5 | .455 |
| A. Participle | 1 | .010 | 28 | .648 | 3 | .273 |
| 1. Past Participle | 0 | .000 | 16 | .370 | 3 | .273 |
| 2. Present + Past Part. | 0 | .000 | 5 | .116 | 0 | .000 |
| 3. Present Participle | 1 | .010 | 7 | .162 | 0 | .000 |
| B. Infinitive + Participle | 0 | .000 | 5 | .116 | 1 | .091 |
| C. Infinitive | 7 | .067 | 9 | .208 | 1 | .091 |
| PREDICATE MODIFIERS | 115 | 1.099 | 146 | 3.380 | 42 | 3.818 |
| A. Verb Modifiers | 102 | .975 | 139 | 3.218 | 38 | 3.455 |
| 1. P + 1 + 2 + 3 | 39 | .373 | 51 | 1.180 | 13 | 1.182 |
| 2. 1 + P + 2 + 3 | 32 | .306 | 48 | 1.111 | 14 | 1.273 |
| a. 1 + P + V + 3 | 9 | .086 | 9 | .208 | 1 | .091 |
| b. 1 + P + v + V + 3 | 8 | .076 | 13 | .301 | 3 | .273 |
| (1) 1+P+be+Vpart+3 | 4 | .038 | 10 | .231 | 2 | .182 |
| (2) 1+P+v +Vpart+3 | 2 | .019 | 1 | .023 | 1 | .091 |
| (3) 1+P+v +Vinf +3 | 2 | .019 | 2 | .046 | 0 | .000 |
| c. 1 + v + P + V + 3 | 15 | .143 | 26 | .602 | 10 | .909 |
| (1) 1+be+P+Vpart+3 | 4 | .038 | 21 | .486 | 8 | .727 |
| (2) 1+v +P+Vpart+3 | 2 | .019 | 2 | .046 | 1 | .091 |
| (3) 1+v +P+Vinf +3 | 9 | .086 | 3 | .069 | 1 | .091 |
| 3. 1 + 2 + P + 3 | 12 | .115 | 10 | .231 | 6 | .545 |
| 4. P + Rel | 9 | .086 | 20 | .463 | 5 | .455 |
| 5. Split Phrases | 10 | .096 | 10 | .231 | 0 | .000 |
| B. Reflexive Phrases | 1 | .010 | 3 | .069 | 2 | .182 |
| C. Adv.-equivalent Phrases | 12 | .115 | 2 | .046 | 2 | .182 |
| TOTAL | 140 | 1.338 | 205 | 4.745 | 48 | 4.364 |